Non-Communicable Diseases Watch

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Atrial Fibrillation

Key Points

※ Atrial fibrillation is a common type of arrhythmia (problem with the rate or rhythm of the heartbeat). While some people with atrial fibrillation may not experience any symptom at all, others report feeling palpitations, chest discomfort or dizziness. A few people develop sudden and severe shortness of breath. In 2010, the number of individuals with atrial fibrillation was estimated to be 33.5 million and the number of new cases was thought to be 4.7 million per year worldwide.

※ Among middle-aged adults, more than half of new-onset atrial fibrillation could be attributed to one or more cardiovascular risk factors, including elevated blood pressure, overweight and obesity, diabetes mellitus, smoking and prior heart disease.

※ Atrial fibrillation is a cause of significant morbidity and mortality. For example, people with atrial fibrillation are up to 5 times as likely to have a stroke and 3 times as likely to die from heart failure compared with people without atrial fibrillation.

※ In Hong Kong, a study showed that atrial fibrillation affected around 7% of community-dwelling elderly aged 65 and above. Of 8 852 episodes of inpatient discharges and deaths due to atrial fibrillation in public and private hospitals in 2014, nearly three-quarters (74.3%) occurred in elders aged 65 and above.

※ Although the risk of atrial fibrillation increases with age, the disease risk can be reduced by leading a healthy lifestyle and controlled through proper treatment. It includes eating a heart-healthy diet; being physically active; maintaining a healthy weight and waist circumference; and not smoking.

※ Refrain from alcohol consumption. Evidence on possible heart benefit of alcohol remains controversial. Moreover, as a cancer-causing agent, alcohol should not be something to consider to protect the heart. There are better, safer and more effective means to keep the heart healthy.

※ For those who have atrial fibrillation, they should follow the treatment plans, take medications as prescribed and have regular follow-up appointments with doctors.

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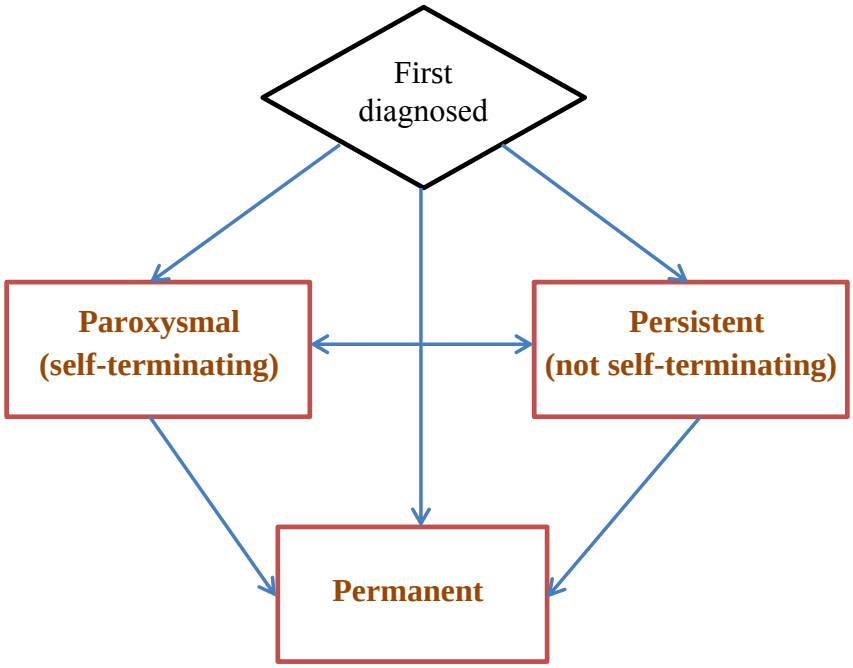
Atrial Fibrillation

Atrial fibrillation is a common type of arrhythmia (problem with the rate or rhythm of the heartbeat). It occurs when the electrical impulses cause the heart's two upper chambers (atria) to contract very fast and irregularly. As a result, blood pools in the atria and cannot be pumped completely into the heart's two lower chambers (ventricles). Atrial fibrillation decreases the efficiency of the pumping action and increases the risk of blood clot formation inside the heart. This can lead to life-threatening complications, such as heart failure and stroke.[1] While some people with atrial fibrillation may not experience any symptom at all, others report feeling palpitations, chest discomfort or dizziness. A few people develop sudden and severe shortness of breath.[1, 2]

Based on the duration and presentation of arrhythmia, atrial fibrillation broadly falls into three major forms: paroxysmal, persistent and permanent (Figure 1). Paroxysmal atrial fibrillation is a condition in which episode of arrhythmia generally lasts 7 days or less, usually within 24 hours. In persistent atrial fibrillation, arrhythmia sustains beyond 7 days. Persistent atrial fibrillation usually leads to permanent atrial fibrillation, in which intervention to restore normal rhythm has failed.[2] Over time, both paroxysmal and persistent forms may result in permanent atrial fibrillation with reported progression rates ranging from about 9% (from paroxysmal to permanent) to 30% (from persistent to permanent) at 1 year.[3-5] An international survey of 9 816 patients with atrial fibrillation who had at least one atrial fibrillation episode in the past 12 months observed that permanent atrial fibrillation accounted for about half of patients (49.6%), followed by paroxysmal atrial fibrillation (26.5%) and persistent atrial fibrillation (23.8%).[6]

Figure 1: Patterns of atrial fibrillation[2]



Global Epidemiology of Atrial Fibrillation

Disease Burden

A systematic review of population-based studies of atrial fibrillation published from 1990 to 2010 from the 21 Global Burden of Disease regions reported a progressive increase in the worldwide incidence, prevalence, and overall burden of atrial fibrillation (Table 1).[7] Factors contributing to the increased global burden of atrial fibrillation might include: progressive ageing of the world population; rising prevalence of risk factors associated with the disease (such as obesity and hypertension); emerging medical technologies with growing ability to identify atrial fibrillation; and improved survival of individuals with coronary artery disease and heart failure which predisposed to atrial fibrillation.[8, 9] Globally, it was estimated that 33.5 million patients (20.9 million for men; 12.6 million for women) had atrial fibrillation in 2010. The number of new atrial fibrillation cases was estimated to be 4.7 million (2.7 million for men; 2.0 million for women) per year.[7]

In Western countries, atrial fibrillation is an important cause of health care expenditure. Annual direct-cost estimates per patient ranged from US$10,100 to US$14,200 in the United States (U.S.) and from €450 to €3,000 in Western Europe. If indirect costs were included, costs increased by up to 20%. Where reported, inpatient care and interventional procedures represented the largest cost component and accounted for 50% to 70% of mean total costs. Due to ageing population, the costs of illness attributable to atrial fibrillation are expected to increase in future.[10]

Table 1: Estimated global burden of atrial fibrillation in 1990 and 2010

		1990	2010	Change
Age-adjusted Incidence (per 100 000 person-years)				
Men:	All ages	60.7	77.5	↑ 27.7%
	Age ≥35 years	141.0	181.2	↑ 28.5%
Women:	All ages	43.8	59.5	↑ 35.8%
	Age ≥35 years	102.0	139.7	↑ 37.0%
Age-adjusted Prevalence (per 100 000 population)				
Men:	All ages	569.5	596.2	↑ 4.7%
	Age ≥35 years	1 307.4	1 368.5	↑ 4.7%
Women:	All ages	359.9	373.1	↑ 3.7%
	Age ≥35 years	826.5	856.8	↑ 3.7%
Age-adjusted Mortality (per 100 000 population)				
Men:	All ages	0.8	1.6	↑ 100.0%
	Age ≥35 years	1.9	3.8	↑ 100.0%
Women:	All ages	0.9	1.7	↑ 88.9%
	Age ≥35 years	2.2	4.2	↑ 90.9%
Age-adjusted Disability-adjusted Life Years (DALYs, per 100 000 population)				
Men:	All ages	54.3	64.5	↑ 18.8%
	Age ≥35 years	125.2	149.3	↑ 19.2%
Women:	All ages	38.6	45.9	↑ 18.9%
	Age ≥35 years	89.3	106.8	↑ 19.6%

Source: Global Burden of Disease 2010 Study.

Major Risk Factors

Studies implicated a number of demographic risk factors (such as increasing age, men, having a family history and Whites), cardiovascular diseases (including hypertension, coronary heart disease, valvular heart disease and congestive heart failure) and other medical problems (such as chronic kidney disease, hyperthyroidism, diabetes mellitus, chronic obstructive pulmonary disease and sleep-disordered breathing), excess body weight as well as certain health-related behaviours (such as smoking and alcohol consumption) in atrial fibrillation (Box 1).[11, 12]

Box 1: Major risk factors for atrial fibrillation

Advancing age — Anyone can have atrial fibrillation, but the risk is greater as people age. For each advancing decade of age, the risk of developing atrial fibrillation are about doubled.[13] For example, men aged 75 to 79 were 2 times and more than 5 times respectively as likely to have atrial fibrillation as men aged 65 to 69 and men aged 55 to 59.[7]

Sex — Men are 50% more likely to have atrial fibrillation than women.[13]

Family history of atrial fibrillation — Atrial fibrillation has a familial component, especially atrial fibrillation of early onset. Compared with people who had no parental history of atrial fibrillation, those who had at least one parent with atrial fibrillation would have 85% increased risk of atrial fibrillation.[14]

Ethnicity — Atrial fibrillation is more common in Whites than in other racial groups, such as Blacks and Asians.[11, 15] For example, a U.S. study found that Whites had 32% increased risk of atrial fibrillation at age 50 compared with non-Whites.[15]

Cardiovascular diseases, such as hypertension, coronary heart disease, valvular heart disease and congestive heart failure — For example, the Framingham Heart Study (U.S.) found that men with congestive heart failure, valve diseases and hypertension was 4.5 times, 1.8 times and 1.5 times as likely to develop atrial fibrillation as men without the same diseases respectively. In women, the corresponding risks were 5.9 times, 3.4 times and 1.4 times.[13]

Chronic kidney disease — The Atherosclerosis Risk in Communities (ARIC) study (U.S.) found a graded, increased risk of incident atrial fibrillation with deteriorating kidney functions (based on estimated glomerular filtration rate or level of albuminuria).[16] Another population-based cohort study in the U.S. also observed that people with chronic kidney disease were about 1.5 times to 2.9 times as likely to develop atrial fibrillation as those without chronic kidney disease, dependent on the severity (or stage) of chronic kidney disease.[17]

Hyperthyroidism — A population-based cohort study of general practice patients in Denmark observed that people with subclinical hyperthyroidism and overt hyperthyroidism had 31% and 42% increased risk of atrial fibrillation compared with those having normal thyroid gland function respectively.[18]

Diabetes mellitus — A meta-analysis of cohort and case-control study found that people with diabetes had 39% increased risk of atrial fibrillation compared with non-diabetics.[19]

Box 1: Major risk factors for atrial fibrillation (continue)

Lung diseases, such as chronic obstructive pulmonary disease [20, 21] — For men, the Malmo Preventive Project (Sweden) reported that per litre reduction in forced expiratory volume in one second (FEV_1) and forced vital capacity (FVC) was associated with 20% and 8% increased risk of atrial fibrillation respectively. For women, the corresponding risk increased by 39% and 20%.[20]

Sleep-disordered breathing, e.g. the occurrence of apnoea during sleep may serve as a trigger of paroxysms of atrial fibrillation[11] — The Sleep Heart Health Study (U.S.) reported that people with sleep-disordered breathing were 4 times as likely to have atrial fibrillation as those without sleep-disordered breathing.[22]

Overweight and obesity — Overweight (BMI 25.0 to <30.0) and obese (BMI ≥30) men had 40% and 71% increased risk of atrial fibrillation compared to those with normal-weight respectively. In women, the corresponding risks increased by 44% and 101%.[23]

Smoking — The ARIC study reported that current smokers were about twice as likely to develop atrial fibrillation compared with never smokers. The corresponding increased risk for former smokers and ever smokers were 32% and 58% respectively.[24]

Alcohol consumption — Compared with non-drinkers, current drinkers of 1 drink (12g alcohol)/day, 2 drinks/day, 3 drinks/day, 4 drinks/day and 5 drinks/day had 8%, 17%, 26%, 36% and 47% increased risk of atrial fibrillation respectively. These findings indicated that alcohol consumption, even at moderate intakes, would increase atrial fibrillation risk.[25]

Health Consequences

Atrial fibrillation is a cause of significant morbidity and mortality. It impairs heart function and increases the risk of stroke. Independent of common coronary heart disease risk factors and potential confounders, a large cohort study in the U.S. reported a 70% increased risk of myocardial infarction (heart attack) among people with atrial fibrillation compared to those without atrial fibrillation.[26] Heart failure promotes atrial fibrillation while atrial fibrillation aggravates heart failure.[2] Compared to people without the disease, those with atrial fibrillation were 11 times as likely to develop and 3 times as likely to die from heart disease, as well as up to 5 times as likely to have a stroke.[27, 28]

Cognitive dysfunction, including vascular dementia, may also be related to atrial fibrillation. A meta-analysis of 8 prospective observational studies found that atrial fibrillation was associated with a 42% increased risk of dementia.[29]

Overall, a systematic review and meta-analysis of 30 cohort studies observed that women and men with atrial fibrillation would have 69% and 47% increased risk of all-cause mortality compared with men and women without the disease respectively. Compared with men having disease, women with atrial fibrillation also showed a 12% increased risk of all-cause mortality.[30]

Local Situation

Atrial fibrillation is common in Hong Kong, especially among elders who are often asymptomatic. Using a hand-held electrocardiograph device, a screening programme on atrial fibrillation for 1 581 community-dwelling elders aged 65 and above in 2013/14 found that around 7% of elders were detected having atrial fibrillation.[31]

As shown in Table 2, the overall crude rate of inpatient discharges and deaths due to atrial fibrillation increased from 93.8 episodes per 100 000 population in 2007 to 122.2 episodes per 100 000 population in 2014. Of 8 852 episodes of inpatient discharges and deaths due to atrial fibrillation in 2014, nearly three-quarters (74.3%) occurred in elders aged 65 and above.[32]

Prevention and Control of Atrial Fibrillation

Although the risk of atrial fibrillation increases with age, the disease risk can be reduced by leading a healthy lifestyle and controlled through proper treatment.[33] The ARIC study in the U.S. showed that up to 56.5% of new-onset atrial fibrillation among middle-aged adults could be attributed to one or more cardiovascular risk factors, including elevated blood pressure, overweight and obesity, diabetes mellitus, smoking and prior heart disease.[34] On the other hand, another Swedish prospective study found that four healthy lifestyle factors combined (i.e. maintaining an optimal body weight, regular exercise, no or low-level alcohol consumption and not smoking) were associated with a halving of the risk of atrial fibrillation.[35]

Table 2: Inpatient discharges and deaths due to atrial fibrillation in public and private hospitals by sex, 2007 and 2014

	2007	2014	Change
Men			
Number of episodes	2 947	4 189	↑ 42.1%
Crude rate*	89.7	125.2	↑ 39.6%
Women			
Number of episodes	3 541	4 663	↑ 31.7%
Crude rate*	97.5	119.7	↑ 22.8%
Overall			
Number of episodes	6 488	8 852	↑ 36.4%
Crude rate*	93.8	122.2	↑ 30.3%

Note: * Per 100 000 population of respective sex.
Sources: Hospital Authority, Department of Health and Census and Statistics Department.

To reduce the disease burden of atrial fibrillation, it is important to reduce cardiovascular risk factor levels through primary prevention strategies. They include:

- **Eating a heart-healthy diet** that is low in saturated and trans fats, salt and sugars; and rich in fruit, vegetables and whole-grains;
- **Being physically active**;
- **Maintaining a healthy weight and waist circumference**. For Chinese adults in Hong Kong, aim for a body mass index (BMI) between 18.5 and 22.9 kg/m^2, and a waist circumference of less than 90 cm (~ 36 inches) for men and less than 80 cm (~ 32 inches) for women;
- **No smoking**;
- **Refraining from alcohol consumption**. It is noteworthy that evidence on possible heart benefit of alcohol remains controversial. Moreover, as a cancer-causing agent, alcohol should not be something to consider to protect the heart. There are better, safer and more effective means to keep the heart healthy.

Depending on the type of atrial fibrillation, clinical presentations, coexisting medical conditions and risk profiles, management of atrial fibrillation varies from person to person. Two important treatment goals involve (1) controlling of heart rate or rhythm and (2) prevention of thromboembolism such as stroke.[2] Apart from committing to a heart-healthy lifestyle, they should follow the treatment plans, take medications as prescribed and have regular follow-up appointments with their family doctors.

To find a family doctor that suits their needs, members of the public can visit the Primary Care Directory (PCD) developed by the Primary Care Office of the Department of Health at www.familydoctor.gov.hk.

The PCD Mobile App can be downloaded from both Apple App Store and Google Play Store by scanning the following QR codes:

(Apple App Store)

(Google Play Store)

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World Stroke Day 2016

Established by the World Stroke Organization in 2006, World Stroke Day is observed worldwide on October 29 to underscore the serious nature and high rates of stroke, raise awareness of the prevention and treatment of the condition, and ensure better care and support for survivors.

Although stroke is a complex medical issue, there are ways to significantly reduce its impact. Thus, the theme for World Stroke Day 2016 is **Face the Facts: Stroke is Treatable** with the tagline of: **Lives can improve with better awareness, access, and action**.

To know more about World Stroke Day 2016 and keep up to date with the Campaign, please visit http://worldstrokecampaign.org or its Facebook Fan page at https://www.facebook.com/worldstrokecampaign.

Non-Communicable Diseases (NCD) WATCH *is dedicated to promote public's awareness of and disseminate health information about non-communicable diseases and related issues, and the importance of their prevention and control. It is also an indication of our commitments in responsive risk communication and to address the growing non-communicable disease threats to the health of our community. The Editorial Board welcomes your views and comments. Please send all comments and/or questions to so_dp3@dh.gov.hk.*