For Immediate Release

November 19, 2018

Using Big Data to Reduce the Risk of Stroke

People with irregular and abnormally fast heart rates caused by a condition called atrial fibrillation could be at a greater risk of stroke and bleeding because they are not receiving optimal treatment, warn scientists from UCL and the Medical Faculty of The University of Hong Kong (HKUMed).

Two studies recently published by the team in the *Journal of the American College of Cardiology* and the *Postgraduate Medical Journal* show that patients with atrial fibrillation (AF) are often prescribed a suboptimal level or type of anticoagulant medication to help prevent blood clots from forming.

The researchers, who specialise in improving medication safety, say treatment could improve through further healthcare big data research.

"Anticoagulants are an effective treatment but come with a high-risk of side effects so their use must be carefully managed and it's essential that we study large and varied populations to find out the best way of doing this," explained co-author Dr Wallis Lau (UCL School of Pharmacy).

"Our studies show that men and women are susceptible to different side effects from anticoagulants and because the window for delivering the correct treatment is very narrow, patients would benefit from being closely monitored to ensure they receive the optimum treatment," added co-author Dr Esther Chan (Department of Pharmacology and Pharmacy, HKUMed).

AF is the most common heart rhythm disturbance, affecting around 1 million people in the UK, 70,000 people in Hong Kong and 10 million people in China, and its prevalence is growing globally.*

People with AF have a higher risk of blood clots forming and are treated with anticoagulants to reduce their chances of developing serious conditions, such as strokes and heart attacks.

Warfarin is most commonly prescribed, but newer types of anticoagulants called non-vitamin K antagonist oral anticoagulant (NOAC) are becoming increasingly common and may prove a more effective treatment option, particularly for women. These include rivaroxaban, dabigatran, apixaban and edoxaban.

Previously, the difference in clinical outcomes between men and women in response to different anticoagulant therapy had not been investigated.

By studying 4,972 men and 4,834 women[1] being treated for AF in the Hong Kong Hospital Authority, the researchers found that women treated with NOACs had a lower risk of intracranial bleeding compared to those treated with warfarin in a controlled way (0.4 vs 1.7 per 100 patient-years; adjusted hazard ratio: 0.16, 95% confidence interval: 0.06-0.40).

The same effect was not seen in men, and the risks of ischaemic stroke and gastrointestinal bleeding with NOACs versus warfarin were comparable for both sexes.

A second study[2] highlighted the issue of patients not switching to NOACs from warfarin when they spent less than 65% of the time within the correct therapeutic range to be optimally treated with warfarin.

NOACs have a different mechanism of action and have a wider therapeutic range in which they can be used with fewer side effects than warfarin. They could, therefore, be a safer and more effective treatment for people who are treated with warfarin and within the therapeutic range less than 65-70% of the time.

The team found that monitoring the time patients are in the therapeutic range and relaying these

findings to them to discuss treatment options did not have any impact on whether they switched to a NOAC from warfarin, suggesting other additional barriers to change.

Professor Ian Wong (HKUMed) also commented that real-world data is especially suitable for healthcare providers to evaluate their service.

The team has recently used electronic health data in Hong Kong to identify the percentage of high risk new patients with AF who are prescribed anticoagulants for prevention of stroke and heart attack.

Data from ongoing work found that the percentage increased from 19% in 2010 to 45% in 2016. Professor Ian Wong said, "It is encouraging to see a significant increase in the percentage of patients on treatment but there is still room for improvement. The Hospital Authority is currently developing new services to continue to improve the care of patients with AF."

These anticoagulant studies were of particular interest to the community, highlighting the importance of men and women discussing the risks and benefits of anticoagulant treatment with their doctor. Furthermore, these studies will assist healthcare providers with the evaluation of their services.

[1] Law SWY, Lau WCY, Wong ICK, Lip GYH, Mok MT, Siu CW, &Chan EW*. Sex-based differences in outcomes of oral anticoagulation in patients with atrial fibrillation. *J Am Coll Cardiol*,2018; 72(3): 271-282. doi: 10.1016/j.jacc.2018.04.066.
[2]Huang D, Wong CL, Cheng KW, Chan PH, Yue WS, Wong CK, Ho CW, Wong ICK, Chan EW, Siu CW. 'Impact of provision of time in therapeutic range value on anticoagulant management in atrial fibrillation patients on warfarin', *Postgrad Med J 2018;* 94: 207-211.
doi: 10.1136/postgradmedj-2017-135457
*Wong CX, Brown A, Tse HF, Albert CM, Kalman JM, Marwick TH, Lau DH, Sanders P. 'Epidemiology of Atrial Fibrillation: The Australian and Asia-Pacific Perspective', *Heart Lung Circ. 2017 Sep 17; 26(9):870-879*

About HKUMed (LKS Faculty of Medicine, The University of Hong Kong)
HKUMed is the longest established faculty in the tertiary sector in Hong Kong. Founded as the Hong Kong College of Medicine for Chinese in 1887 and later renamed the Hong Kong College of Medicine in 1907, the Faculty was accorded the position of premier Faculty when the University was opened in 1911. Serving Hong Kong for 131 years, the Faculty and its predecessors have been playing a pioneering role in medical education, training and research since its establishment. From its modest beginning, the Faculty has now become the largest faculty of the University, with over 350 full-time academic and academic-related staff and 800 research and research-related support personnel. The undergraduate student population is about 2,900 and the postgraduate student population is about 1,500. The Faculty is comprised of 14 departments, School of Biomedical Sciences, School of Chinese Medicine, School of Nursing, School of Public Health and a number of research centres focusing on various strengths of research.

About UCL (University College London)
UCL was founded in 1826. We were the first English university established after Oxford and Cambridge, the first to open up university education to those previously excluded from it, and the first to provide systematic teaching of law, architecture and medicine. We are among the world's top universities, as reflected by performance in a range of international rankings and tables. UCL currently has over 41,500 students from 150 countries and over 12,500 staff. Our annual income is £1.45 billion.
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