The Use of New Antiseizure Medications for Epilepsy

Biography

Professor Patrick KWAN is a Fellow of the Australian Academy of Health and Medical Sciences. He is a clinician-researcher in epilepsy, particularly in the outcomes, clinical pharmacology, and application of Precision and Personalised Medicine. He is Professor of Neurology at the School of Translational Medicine, Monash University, where he leads a team of more than 50 doctoral students and post-doctoral fellows in research than spans across stem cells, artificial intelligence, medtech, animal models, outcomes, drug development, clinical trials and health economics. He is also a Co-Director of Monash Institute of Medical Engineering, a cross-faculty institute that supports research and commercialisation of medtech solutions for unmet clinical needs. He is the ex-director and now a Consultant Neurologist of the Epilepsy Unit at Alfred Health, which he established to become the largest epilepsy program in Melbourne, Australia.

He has received more than AUD66 million research funding as the principal investigator, and published more than 360 peer-reviewed articles, many in influential journals as first or corresponding author, including the New England Journal of Medicine, the Lancet, British Medical Journal, the Lancet Neurology and JAMA Neurology. Google Scholar citations >34,000 times. He served as Chair of the Medical Therapies Commission of the International League Against Epilepsy (2013-2017), and is currently a board member of the Neurotechnology Section.

Abstract

Epilepsy is a complex spectrum of disorders characterised by unpredictable seizures that differ in type, cause (including brain structural, genetic, metabolic or autoimmune), and severity. Patients have surges of electrical activity in the brain which can lead to recurrent seizures, increased hospitalisation, comorbidities and mortality. Worldwide, over 50 million people are living with epilepsy and 4% of the population develop epilepsy during their lifetime. A previous population-based study in Hong Kong reported that 4 in 1000 people had active epilepsy.

The mainstay of treatment for epilepsy is anti-seizure medications (ASMs) which suppress seizure occurrence without modifying the underlying disease process. There has been an explosion of newer ASMs approved in the past 30 years. They have not been shown to have superior efficacy over the older drugs, although they may have better tolerability. For instance, lamotrigine and levetiracetam have been showed to have lower teratogenic risks compared with valproate and carbamazepine. There is evidence that brivaracetam is associated with fewer behavioural adverse effects than levetiracetam.

Nonetheless, current ASMs fail to control epilepsy in one third of patients. Finding the right ASM(s) for an individual has remained a largely trial-and-error process of selecting from more than 20 different drugs with critical time lost in trying ineffective ones until the 'right' one is found. The consequence can be years of poor quality of life, productivity loss, and increased risk of mortality. More reliable ways to predict treatment response and to select the most effective medication for the individual patients are needed.