

## Heart Congress 2020: Cardio Embolic Stroke: A review- King Abdullah International Medical Research Center, Saudi Arabia

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### Introduction:

Stroke continues to have a major impact on the public health of our nation. Preventing stroke is a key to reducing its societal burden from a human and financial perspective. WHO deemed stroke as second leading cause of morbidity and mortality. Stroke (ischemic and hemorrhagic) constitutes 7% of all deaths annually in North America and Western Europe. In Saudi Arabia, accurate estimate is lacking, however, based on an older provincial population-based survey, the estimate is 30/100,000 and about one every 6 minutes. Stroke prevention is being transformed from a personal style or belief into evidence-based medicine. Ischemic stroke constitute about 70-80% of all strokes and is not a single disease; it is a system of diverse etiologies and pathogenic mechanisms. Although epidemiological realities are distressing, major advances in secondary stroke prevention and to a lesser extent, in primary prevention, has been elucidated. Despite the fact that the largely artificial distinction of primary and secondary prevention has become elusive, with the multitude of risk factors added together in different individual poses similar risk, hence, equally aggressive non-pharmacological and pharmacological intervention. Considerable research has led to a better delineation of risk factors, as well as an expanded understanding of pathophysiological subtypes. Atherosclerosis of the brain and heart vessels plays a predominant pathological role. Large artery atherosclerosis leads to hypo perfusion or atherogenic emboli, whereas micro atheroma and lipohyalinosis of small penetrating vessels cause lacunar infarcts. Approximately 20% of ischemic strokes are due to cardio embolism, commonly due to atrial fibrillation of up to 45%. 30% are cryptogenic and less than 5% due to a variety of unusual causes. Stroke research has evolved over the past decade elaborating that; different subtypes of stroke respond differently to specific interventions for stroke prevention of which cardio embolic strokes bear a big toll.

**Objectives:** Cardiac embolism accounts for an increasing proportion of ischemic strokes, and might multiply several-fold over the next decades. However, research points to several potential strategies to stem this expected rise in cardioembolic stroke. First, although one-third of strokes are of unclear cause, it is increasingly accepted that many of these cryptogenic strokes arise from a distant embolism rather than in-situ cerebrovascular disease, leading to the recent formulation of “embolic stroke of undetermined source” (ESUS) as a distinct target for investigation. Second, recent clinical trials have indicated that ESUS may often stem from subclinical atrial fibrillation (AF) which can be diagnosed with prolonged heart-rhythm monitoring. Third, emerging evidence indicates that a

thrombogenic atrial substrate can lead to atrial thromboembolism even in the absence of AF. Such an atrial cardiopathy may explain many cases of ESUS, and oral anticoagulant drugs may prove to reduce stroke risk from atrial cardiopathy given its parallels to AF. Non-vitamin K antagonist oral anticoagulant (NOAC) drugs have recently expanded therapeutic options for preventing cardioembolic stroke and are currently being tested for stroke prevention in patients with ESUS, including specifically those with atrial cardiopathy. Fourth, increasing appreciation of thrombogenic atrial substrate and the common co-existence of cardiac and extra-cardiac stroke risk factors suggests benefits from global vascular risk factor management in addition to anticoagulation. Finally, improved imaging of ventricular thrombus plus the availability of NOAC drugs may lead to better prevention of stroke from acute myocardial infarction and heart failure.

**Results:** Twenty-six million people worldwide experience a stroke each year, making it the second-leading cause of mortality and a leading cause of long-term disability.<sup>1</sup> One-third of strokes represent intracerebral or subarachnoid hemorrhage while two-thirds represent cerebral ischemia.<sup>1</sup> Ischemic stroke can result from a variety of causes such as atherosclerosis of the cerebral circulation, occlusion of cerebral small vessels, and cardiac embolism.<sup>2</sup> Of these causes, cardioembolic stroke has significance for two reasons. First, cardiac embolism causes more severe strokes than other ischemic stroke subtypes.<sup>3</sup> Second, as treatment of hypertension and dyslipidemia improves, cardiac embolism has accounted for an increasing share of strokes in high-income countries such as Canada.<sup>4</sup> Despite a decrease in the overall incidence of stroke, cardioembolic strokes have tripled during the past few decades and may triple again by 2050 based on projections from the United Kingdom.<sup>5</sup> Given demographic changes and increasing life expectancy, risk factors for cardiac embolism may become more common in low- and middle-income countries as well.<sup>6</sup> Conversely, oral anticoagulant therapy can prevent up to 70% of strokes in patients with the most common cardioembolic risk factor, namely atrial fibrillation (AF).

**Conclusions:** Antithrombotic therapy is a mainstay of stroke prevention, but patients with infective endocarditis face a high risk of hemorrhagic stroke. There is a paucity of high-level evidence and therefore considerable controversy regarding starting or continuing antithrombotic therapy in this population.