Mission Possible, just BE FAST

Stroke encompasses clinical manifestations of brain function disruption symptoms characterised by sudden loss of neurological functions which can be easily remembered by the acronym BE FAST, writes Dr Praveen Kumar Kaudlay

Stroke stands as the second most prevalent cause of mortality globally, the third highest in India, and a leading cause of life-long permanent disability. Statistics reveal that one in every four individuals will experience a stroke during their lifetime, with a stroke occurring every five seconds worldwide. Alarmingly, despite being preventable, Bengaluru city alone witnesses nearly 40 new cases of stroke daily.

Stroke encompasses clinical manifestations of brain function disruption symptoms characterised by sudden loss of neurological functions which can be easily remembered by the acronym BE FAST, resulting from sudden blockage of blood flow in 85 per cent of cases or bleeding in 15 per cent of a brain region. The symptoms are persistent and can be characterised by traits lasting 24 hours or more, often stemming from compromised blood supply to the brain resulting in infarction (death of cells), long-lasting unless treated as an emergency within 4.5 hours of symptom onset or 24 hours. TIA (Transient Ischaemic Attack) signifies transient neurological dysfunction caused by ischemia (restricted blood flow and oxygenation) without infarction or permanent damage from ischemia.

Time is brain

When the blood supply to the brain is compromised or intracranial bleeding, neurons, the brain's fundamental cells, are lost. The forebrain, critical for processing complex cognitive tasks, movement, and sensory perception, houses approximately 22 billion neurons.

During a stroke, occurring at a rate of 1.9 million neurons lost per minute, the affected brain ages 3.6 years with each passing hour devoid of treatment. An ischemic stroke leads to the development of an irreversible lack of blood flow and oxygen supply (ischemia) in a specific brain region known as the “core”. Surrounding this core is an area where neurons experience paralysis; a reversible ischemic component in the “penumbra”.

Early and prompt treatment within the first few hours of a stroke can often reverse its effects and minimise damage in many patients. Dr Suryanarayana Sharma, a senior neurologist and stroke specialist, emphasises the urgency of timely intervention, lamenting the lack of awareness regarding the time-sensitive nature of stroke treatment in India, especially in comparison to heart attacks.

Burden in India

Under the auspices of the National Stroke Registry Programme of ICMR-NCDIR, five population-based stroke registries were established across five Indian regions in 2018-19. The initiative aimed to quantify disease burden and mortality rates across different demographics. Findings indicated that the cumulative risk of stroke was higher in men than in women, and urban residents faced more significant risks than their rural counterparts. High blood pressure emerged as the most prevalent risk factor. Although the trend in stroke-related deaths has not increased over recent decades, the mortality rate remains significantly higher in India compared to countries like Singapore, England, and Sweden.

Lack of awareness, geographical disparity in access to stroke treatments, and myths about the disease in the public in general have been the reasons for the increased mortality observed in India, reasons Dr Suryanarayana Sharma. India faces significant health challenges, with approximately 220 million individuals suffering from high blood pressure, yet only 12 percent of them have it under control. Additionally, an estimated 77 million adults over the age of 18 are living with type 2 diabetes. At the same time, 25 million more are categorised as pre-diabetic, placing them at an increased risk of developing the disease soon.

Dr Vikram Huded, Director of Interventional Neurology at a leading hospital chain in Bengaluru, highlights that additional risk factors in the Indian population compound the substantial burden of high blood pressure and diabetes. These include heart diseases, carotid stenosis — a narrowing of the blood vessels supplying the brain —obstructive sleep apnoea, high cholesterol, smoking, sedentary lifestyles, and obesity. Indians tend to have strokes a decade earlier than the West, observes Dr Vikram.

The golden hour

A four-and-a-half-hour window from the onset of symptoms is known as “the golden hour” for emergency treatment with clot-busting medication through a regular IV (intravenously). A recent analysis of treatment outcomes has shown that initiating treatment within 60 minutes of symptom onset produces excellent outcomes with low rates of morbidity and deaths. Door-

to-needle time is taken from when the suspected stroke patient arrives at the emergency department to administer a clot-busting drug called Alteplase within 60 minutes, which is considered ideal. In 1995, the use of clot-busting drug (thrombolysis) as an acute intervention to reestablish the blood supply to the brain in stroke-affected patients was introduced, thereby creating one of the most time-critical interventions within a short window of time. Most global stroke guidelines now recommend the intravenous administration of Alteplase drug within 4.5 hours from the symptom onset after a brain imaging has ruled out a brain bleed. In India, another drug, Tenecteplase, is licensed for this indication.

The mechanical option

For strokes involving occlusion due to the blockage of large vessels (the starting parts of the blood supply tree) supplying the brain, the intravenous administration of clot-bursting drugs alone is insufficient to break the clot. Interventional doctors perform a procedure of passing specialised equipment with a guidewire to remove the clot mechanically.
Mechanical thrombectomy is effective if performed up to 24 hours after the onset of symptoms. Dr Dileep Raghavendra Yavagal, the Chief of the Neuro Endovascular division and Clinical Professor of Neurology and Neurosurgery at the University of Miami & Jackson Memorial Hospitals, USA, has been championing the establishment and the global implementation of this game-changing treatment in stroke care. “Suppose you calculate the years of disability left after a stroke; the mechanical thrombectomy has been one of the most cost-effective interventions that rival most treatment options in medicine and dramatically changed the outlook of stroke patients,” says Dr Dileep. Fifty percent of patients treated through this technique return to work with full, independent functioning daily activities in 3-4 months.

Mission thrombectomy was established in 2016. Dr Dileep, the founder and chair of the mission, aims to spread awareness about stroke and develop access to mechanical thrombectomy around the globe, including India, where there is a huge unmet need to develop stroke-ready hospitals. The mission uses public health approaches of health policy advocacy, education, and innovation.

The solution

The Karnataka Stroke Foundation, founded to raise awareness about stroke, treatment advances, and prevention, is led by Dr GT Subhas, a neurologist who stresses on primordial prevention, urging early interventions like blood pressure screenings in schools, dietary control, and family screenings for stroke history and hereditary disorders.