Medical Xpress

Beating the clock for ischemic stroke sufferers

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A ground-breaking computer technology raises hope for people struck by ischemic stroke, which is a very common kind of stroke accounting for over 80 per cent of overall stroke cases. Developed by research experts at The Hong Kong Polytechnic University (PolyU), this novel application that expertly analyses brain scans could save lives by helping doctors determine if a patient has the life-threatening condition.

The CAD stroke technology is capable of detecting signs of stroke from computed tomography (CT) scans. A CT scan uses X-rays to take pictures of the brain in slices. When blood flow to the brain is blocked, an area of the brain turns softer or decreases in density due to insufficient blood flow, pointing to an ischemic stroke.

As demonstrated by Dr Fuk-hay Tang from the Department of Health Technology and Informatics at PolyU, CT scans are fed into the CAD stroke computer, which will make sophisticated calculations and comparisons to locate areas suspected of insufficient blood flow. In 10 minutes, scans with highlighted areas of abnormality will come out for doctors' review. Early changes including loss of insular ribbon, loss of sulcus and dense MCA signs can be identified, helping doctors determine if blood clots are present.

Ischemic stroke occurs when an artery to the brain is blocked, cutting off oxygen and essential nutrients being sent to the brain, so that brain cells die in just a few minutes. Clot-busting drugs are effective in minimising brain damage but they should be administered within three hours from

the onset. Immediate diagnosis and treatment are therefore absolutely essential.

In that sense, a diagnostic tool that can expedite the process will be greatly helpful in saving lives. "The clock is ticking for stroke patients," explains Dr. Tang. "Medications taken in three hours from the onset of stroke are deemed most effective. Chances of recovery decrease with every minute passing by. It usually takes half an hour for the ambulance to arrive at the hospital, at best. Then, another 45 minutes to one hour are needed for CT or MRI scans after the patient has been checked and dispatched for the test, which means some waiting and time will slip by. Afterwards, the brain scan will take another 10 to 15 minutes. If our tool can help doctors arrive at a diagnosis in 10 minutes, the shorter response time will make meeting the target more achievable."

"It might come in handy for physicians with less experience in stroke," adds Dr Tang, "and patient care can be maintained in hospitals where human and other vital resources are already stretched to the limit."

The life-saving application can also detect subtle and minute changes in the brain that would escape the eye of even an experienced specialist, slashing the chances of missed diagnosis. False-positive and false-negative cases, and other less serious conditions that mimic a stroke can also be ruled out, allowing a fully-informed decision to be made.

Furthermore, equipped with the built-in artificial intelligence feature, the CAD stroke technology would learn by experience. With every scan passing through, along with feedback from stroke specialists, the application will improve on its accuracy over time.

"It is important to identify stroke patients and help them get the urgent treatment they need," says Dr Tang. "Prompt and accurate diagnosis is in the forefront of our minds when designing the medical application.

Healthcare professionals should focus on what they do best and let us take care of the rest."

Provided by Hong Kong Polytechnic University