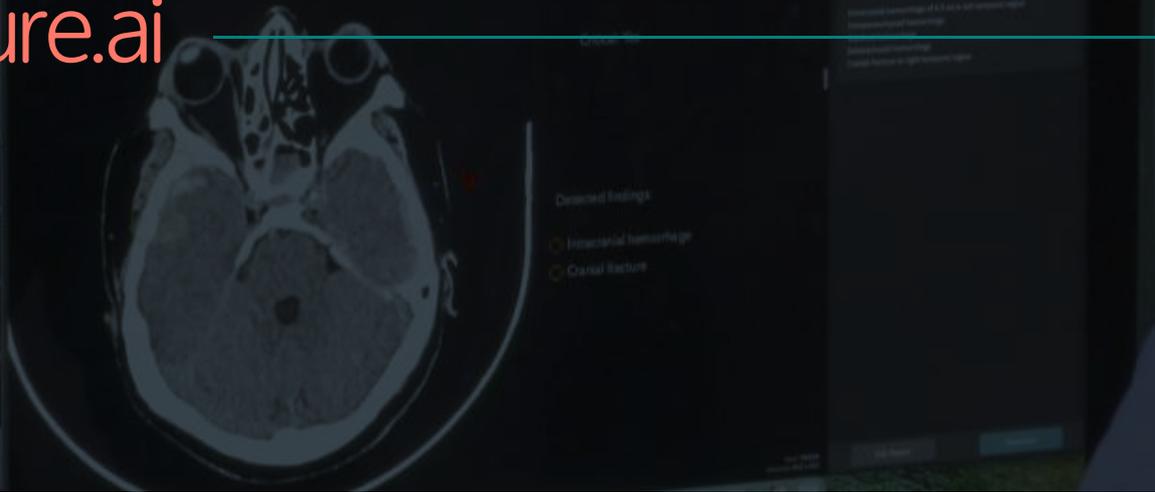# qure.ai

Time is Brain

Impact of AI in treating trauma & stroke patients

Introduction

Aarthi Scans and Labs is one of India largest integrated diagnostic chains with imaging centers across India including in Tier 3 and Tier 2 cities. The organization has adopted Artificial Intelligence (AI) in their Tele-radiology reporting. Tier 3 cities usually lack neurologists in hospitals and any trauma cases need to travel for a couple of hours even to reach a tertiary hospital, which is difficult at night. The main aim of Aarthi Scans is to implement AI in their service for the night reads of Non-Contrast Head CTs (NCCT), in absence of a Neurologist or a Radiologist to aid the treatment faster for time sensitive and emergency trauma cases.

Background

In India, more than 100,000 lives are lost every year with over 1 million suffering from serious head injuries. 1 out of 6 trauma victims die, as compared to the USA where that number is 1 out of 200. Traumatic Brain Injury (TBI) can be caused by a blow, bump or jolt to the head, the head suddenly and violently hitting an object or when an object pierces the skull and enters brain tissue. Observing one of the clinical signs like amnesia, loss of memory, disorientation, slow thinking or difficulty in concentrating constitutes alteration in the normal brain function. A severe head injury can damage the brain in several ways. For example, brain damage can occur as a result of increased pressure on the brain caused by a blood clot between the skull and the surface of the brain (subdural hematoma), or bleeding in and around the brain (subarachnoid hemorrhage). Several small or large blood vessels in the brain may be damaged in a TBI, which could further lead to a stroke.

A CT scan is the gold standard for a TBI patient's radiological assessment. A CT scan is easy to perform and an excellent test to detect the presence of blood and fractures, the most crucial lesions to identify in medical trauma cases. Qure.ai's head CT interpretation platform – qER, is an FDA 510(k) cleared triage and notification solution. It can analyze head CT scans in under a minute each and prioritize radiologist worklists by severity of abnormalities. This automated triage helps improve patient outcomes significantly. It helps in reduction of stress on Radiologists when there are too many scans to read. It also assists the young radiologists for better analysis and boosts confidence while reporting

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Selection Criteria

While the diagnosis of traumatic brain injury (TBI) is a clinical decision, neuroimaging remains vital for guiding management based on identification of intracranial pathologic conditions. Qure.ai's AI solution, qER, helps to detect brain pathologies. Beyond detection, qER has also received FDA approval to aid in the localization & quantification of intracerebral brain hemorrhage (ICH) and its subtypes, midline shift, and lateral ventricular volume. It also helps in monitoring progression of hemorrhagic stroke, traumatic brain injury, or hydrocephalus.

An Aarthi Scans Case

At Aarthi Scans, head CT cases are processed by Qure's qER, where the brain pathologies are detected, quantified, and triaged in the radiologist's worklist for review and reporting. In the absence of the radiologist at night, trauma cases are directly rushed to the nearby hospitals for further treatment based on the AI results. The head CT studies from all 40 centers of Aarthi Scans are routed to the Qure.ai gateway from a central PACS (Picture Archiving and Communication System) server. Results are shared with referring physicians directly as a preliminary report using a WhatsApp attachment following which a final report is published after the radiologist's review. Aarthi Scans has a centralized Tele-stroke team which immediately calls the referring physicians, and informs them about the results as well, for immediate treatment. The AI report is sent as a preliminary report to the physician to avoid any delay in treatment.

Impact

So far qER has processed close to 2000 head CT studies from the centers of Aarthi Scans, 22% out which were flagged as critical with following distribution over the brain pathologies.

Intracranial Fracture ●
Mass Effect ●
Intracranial Hemorrhage ●

35%
43%
22%

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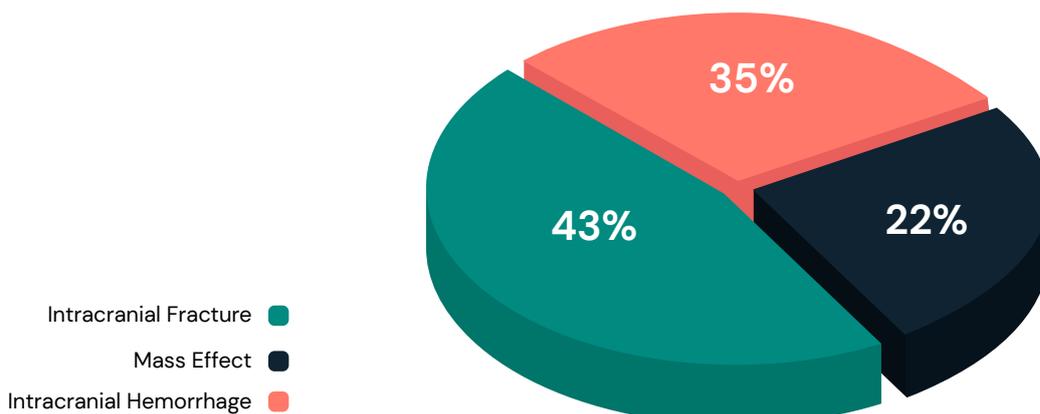
Conclusions

For a stroke patient, a delay can mean the difference between life and death. Dr. Arunkumar Govindarajan, Director, Aarthi Scans and Labs believes AI, when used in healthcare for screening, can change the way patients are treated. Initially qER was deployed in Tenkasi (a small district in Tamil Nādu) to test out its capabilities. There is only one diagnostic center in the entire district, with only one Radiologist (no radiologists at night).

When a patient presents with stroke or brain injury in Tenkasi hospital, the time taken from symptoms to treatment is more than 7 hours owing to multiple factors such as:

> **Lack of a tertiary care hospital in the city forcing patients to travel long distances**

> **Patient would be referred to a diagnostic center for a CT scan**

> **The process at the diagnostic center (billing to scanning) will take some time**

> **A radiologist might take 2 hours to prepare a CT brain report**

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With qER coming in for the management of stroke patients, we have seen massive improvement in mortality and morbidity as it has significantly reduced the symptom to treatment time by 2.5 hours to 5.5 hours (30-70% reduction). Also, patients with smaller infarcts and trauma now can be managed in Tenkasi itself.

qER can significantly reduce the symptom to treatment time. Imagine qER getting deployed in all the non-metro cities, all the head injuries and stroke treatment would start in as early as 30 mins. There would be massive improvement in mortality and morbidity and Radiologist would not be left feeling guilty for not working 24/7.

Dr. Arunkumar Govindarajan
(Director, Aarti Scans)