

## Prediction of Post Stroke recovery: Artificial intelligence could be a key of success

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Madam, Stroke is a leading cause of death and disability around the globe and particularly in low- and middle-income countries, and this burden is increasing.<sup>1</sup> Its incidence in Pakistan, is also increasing daily and shares a significant burden by contributing to an exponential expenditure of resources, finances, community manpower, health services and overall economy.<sup>2</sup> Overall disability burden can be reduced remarkably, if early recovery prediction can be formulated for stroke parameters such as upper limb impairment, swallowing, Shoulder Abduction and Finger Extension (SAFE) score, Motor Evoked Potential (MEP) status, National Institute of Health Stroke Scale (NIHSS) scoring. Existing relevant evidences for the early prediction of stroke recovery, reported the use of blood biomarker as an objective indicator. And among them, some serve as a guide in decision-making for clinical practice, such as: Brain natriuretic peptide (BNP), D-Dimer, and have potential in improving the diagnosis and the management of patients with stroke. MRI findings have also made an accurate prognosis about behavioral outcomes after stroke based on the severity of cognitive impairments.<sup>3</sup> For predicting recovery after stroke, various algorithms approaches have also been done since last 10 years and among Predict Recovery Potential (PREP2), (GRAVo) and (PRESS) models of prediction, studies have supported that the PREP2 algorithm was regarded as potentially valid. To date, only one approach has combined biomarkers within the first few days after stroke to make predictions for individual patients. The Predict Recovery Potential (PREP) algorithm predicts upper-limb functional outcomes by combining biomarkers, neurophysiological and neuroimaging measures to make a prognosis. PREP2 algorithm is probably the easiest approach to operationalize among predictive models and serves as a benchmark for predicting motor recovery after stroke.<sup>4</sup>

So, till now, there is no consensus among both clinicians and scientists on how to apply a specific predictive model in clinical routine or research protocols, in which

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biological and psycho-social factors can be collectively incorporated with Artificial intelligence. Hence these steps are mandatory to be implemented in predictive models considering all the factors mentioned above- and including other factors like cost, knowledge, interface development, resources, time and expertise of both scientists and clinicians. Because a user-friendly interface, such as smartphone apps, will serve as a beneficial benchmark for not only scientists but therapists, clinicians and the general population in future. Artificial intelligence (AI), is an application that is gaining increasing interest and is being incorporated into many fields, including stroke medicine to improve the accuracy of diagnosis and the quality of patient care. Recently, the findings of one study concluded that AI techniques, applied for stroke imaging had demonstrated some promising results. A study by Scott L. Zuckerman et al, in 2012 also emphasized that a successfully designed prediction of stroke algorithm using a multi-disciplinary approach including all bio-psycho and social factors incorporated collectively, could lead to significant improvement in reducing disability after stroke by giving more focused individualized rehabilitation plans for patients.<sup>5</sup>

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