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Neuroimaging-based clinical tools for brain disorders

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EDITORIAL

Neuroimaging-based clinical tools for brain disorders

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Neuroimaging is a branch of medical imaging that has been widely used to probe the function and anatomy of the brain noninvasively. This technique has deepened our understandings of how the brain works and has become a valuable tool for diagnosing disease and assessing brain health. Furthermore, recent advances in analytical approaches and experimental settings have facilitated the development of neuroimaging-based clinical tools for various brain disorders. For this reason, this special issue aims to provide a collection of papers discussing the conceptual and methodological innovations and clinical applications of neuroimaging techniques.

The special session has included five papers contributed by experts who have been studying brain disorders using neuroimaging techniques for many years.

Bi and her colleague focused on neuro-imaging technique as a diagnostic tool for relapse during quit attempts in smoking abstinence. They highlighted the advances made with functional and structural neuroimaging techniques in studying neural mechanisms of smoking abstinence. This study also provided a method to identify smokers with heightened relapse vulner ability prior to quitting attempts. It may help researchers develop effective smoking cessation treatments, thus providing promising strategies for improving the success of quit attempts.

Next, based on the experimental models and different neuroimaging techniques, this special issue presented two papers concerning the applications of neuroimaging techniques in investigating the central mechanisms of acupuncture. Cao et al. integrated meta-analysis, functional magnetic resonance imaging (fMRI), and structural MRI (sMRI) to identify potential target regions of scalp acupuncture/neuro-modulation for anxiety, which may be useful to provide a neuroimaging-based scalp acupuncture map for accurate stimulation. Yang et al. investigated the acute effects of acupuncture on intracranial vessels and blood flow in patients with Parkinson's disease using magnetic resonance angiography. They found that acupuncture had a tendency to increase the total volume of the intracranial internal carotid artery and the volume of the middle cerebral artery. These two papers provided neuroimaging evidence for the clinical treatment of acupuncture.

Moreover, neuroimaging technique has been used to detect cognitive decline, although the underlying disease etiology remains unclear. The following two studies tracked the changes in brain function and structure in patients with

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cognitive decline by using different neuroimaging techniques. von Deneen adopted a T1-weighted brain image to investigate the brain structural abnormalities in patients with acute lacunar stroke, and they also studied the association between brain structural features and cognitive impairment in these patients. By applying the resting-state functional connectivity and gray matter volume analyses, Xu et al. studied the relationship among the education level, memory function, and hippocampus functional and structural alteration in patients with subjective cognitive decline. With the help of advanced neuroimaging techniques, these two studies suggested that structural and functional brain alterations could be used to detect *in vivo* in patients with cognitive decline.

In summary, this special issue covers a collection of studies using neuroimaging to investigate brain disorders. Advanced neuroimaging techniques enable us to explore the underlying principles of brain structural and functional architectures in healthy subjects, as well as pathological alterations in various brain disorders. They hold great potentials for the early diagnosis of brain disorders and the assessments of therapeutic effects. We hope our readers can get valuable information from this special issue, and we would also like to thank all the authors for their significant contributions to this special issue.