

A Novel Magnetic Resonance Imaging (MRI) Technique Reflects Treatment-related Cognitive Deterioration among Childhood Cancer Survivors

Multi-modality treatment, comprising surgery, whole brain irradiation and chemotherapy has led to improved long term survivals for childhood cancer patients with 5 year survival of 80% in many tumors. However, it is associated with significant morbidity from treatment-related complications, including cognitive deterioration, which are prevalent and severely impact upon the patients' quality of life. A research team of HKU was the first group finds diffusion tensor MRI (DTI), a method of MRI, reflects treatment-related cognitive deterioration in childhood cancer survivors.

Diffusion tensor MR imaging (DTI) is a new, non-invasive magnetic resonance imaging (MRI) technique that is advantageous for evaluating the white-matter fibres in the brain. It is based on the detection of the amount and direction of diffusion of water molecules in the brain. When white matter microstructure is disrupted due to disease, this can be detected and quantified using DTI. This new method is safe, fast (less than 5 minutes) and comfort. Also, it can be additional sequence to the routine follow up of brain MRI and obtains quantitative parameters from DTI scans, which correlated significantly with IQ scores after adjusting for age at treatment, irradiation dose and time interval from treatment.

With this discovery, the strategies of treatment can be modified to prevent or minimize brain damage, and the effectiveness of new drugs that may prevent injury to normal brain tissue can be assessed.