

## Commentary

# The Role of Clinical Neuropsychology in the Paediatric Epilepsy Management

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Epilepsy is the most common cause of chronic neurological conditions with typical onset around early to mid-childhood.<sup>1,2</sup> It is a chronic neurological disorder which could impact multiple aspects of a patient's life. Epilepsy is not only medical,<sup>1</sup> but also psychological, cognitive and social.<sup>3</sup>

As reported by Professor Paul Salkovskis in his external consultancy report in reviewing the Clinical Psychology Service in Hospital Authority, there was not a single child neuropsychologist in the force of over 150 clinical psychologists,<sup>4</sup> nor there has been any program driven or protocol based neuropsychological services among public hospitals. Such disparity of service highlights the importance of the development of paediatric neuropsychology.

### Neuropsychological and Psychosocial Sequelae of Epilepsy

Neuropsychology addresses the clinical fact that paediatric patients with epilepsy have long-term cognitive impairment mediated by an atypical brain development. In a paediatric sample with temporal lobe epilepsy, intellectual dysfunction (defined as IQ <79) could be as high as 57%, with possibility of decline over time.<sup>5</sup> Cognitive

dysfunctions such as attention, language, visuo-perceptual ability, memory and executive functions were also demonstrated,<sup>6</sup> and could be unfolded as young as from preschool.<sup>7</sup>

Neuropsychology addresses the side effect of antiepileptic drugs (AED) and surgical procedures on neuropsychological functioning. In a randomised controlled clinical trial that using valproic acid is associated with more significant attentional dysfunction than ethosuximide or lamotrigine in children with newly diagnosed childhood absence epilepsy, even in the cases where seizure freedom was attained. More importantly, those deficits went unnoticed by parents.<sup>8</sup>

In a prospective long study with average follow-up period of 37 years, it was showed that about one-third of patients with epilepsy did not remit, with 14% having on and off remission and relapses, and 19% no remission at all.<sup>9</sup> For those patients with intractable epilepsy, neurosurgery would be considered with goals of making the targeted patient seizure-free or reducing the frequency and severity of the impeding seizures. Gleissiner and colleagues found that paediatric patients had different recovery trajectory comparing to adult controls.<sup>10</sup> Controlling pathology, onset of epilepsy, side and type of surgery, they reported that although both children and the adult control groups showed deterioration in memory at three months post-operation, children showed improvement back to their pre-operation level in terms of verbal memory, and remissions in visual memory as well as attentional function. Those findings on functional recovery, however, were not shown in the adult group. Therefore, planned multiple time-point assessment would be particularly important for children undergoing epilepsy surgeries.

In short, it is clear that pre- and post-treatment neuropsychological assessment is essential. It provides accessory information about the localisation and lateralisation of the epilepsy-specific cognitive impairment,

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quality and outcome control, as well as estimation of the postoperative cognitive development.<sup>11</sup>

Neuropsychology also addresses the impact of epilepsy on children's psychological, social, and academic development. The neuropsychological deficits could lead to psychiatric and behavioural problems. Namely, parents of children with idiopathic epilepsy reported more hyperactivity, emotional and conduct problems, and less prosocial behaviours.<sup>12</sup> Turkey and colleagues<sup>13</sup> found that from parent's reports nearly half (47.9%) of the sampled children and adolescents indicated psychiatric criteria and just over 60% with chronic distress and social impairment. Thome-Souza and colleagues<sup>14</sup> reported that depression found in up to 36.4% and ADHD 29.1% in a children and adolescent sample. Lower relationship quality between parents and child, higher maternal depression, and more family problems were reported.<sup>15</sup>

### Recommendations by Clinical Guidelines

The role of paediatric neuropsychology is substantiated by NICE Guidelines<sup>16</sup> (see also The Hong Kong Epilepsy Guideline<sup>17</sup>). Evaluating the learning disabilities and cognitive dysfunction, especially in language and memory, is recommended. Referral indicators were also clearly stated, including when (i) educational difficulties arise, (ii) MRI finding reveals abnormalities in cognitively important brain regions, (iii) the patients complain of memory or other cognitive deficits and/or decline, and (iv) as part of presurgical evaluation (in Hong Kong Guideline only). When there is suspected non-epileptic attack disorder or when seizures are not controlled and/or there is diagnostic uncertainty or treatment failure, referral could also be made for further investigation and treatment, alongside with soon referral to tertiary service.

The International League Against Epilepsy Psychology Task Force recommended routine psychological screening should be implemented. Potential side-effect of AED should be evaluated in a standardised way. For children in particular, multi-informant screenings should be used. When significant symptoms are identified, a formal mental health assessment should be conducted to inform the selection of treatment elements.<sup>18</sup>

In terms of interventions for seizure control, when the patients or the specialists consider medical treatment to be inadequate, psychological interventions such as relaxation, cognitive behavioural therapy (CBT), biofeedback could be used with aims of improving quality of life in some

patients, but not for reduction in seizure frequency. Relaxation and CBT was also recommended for children and young people with drug-resistant focal epilepsy for depressive and anxiety symptoms.<sup>16</sup> Mindfulness training on awareness and acceptance of seizure-related symptoms and seizure control, albeit its current weak evidence, was emerging as an alternative intervention.<sup>18</sup>

When there are comorbid mood and adjustment disorders, or it is found that the mood conditions such as depression and anxiety disorders are affecting the case management such as drug compliance, psychological interventions could help alleviating the mood symptoms and enhance health promoting behaviours.<sup>19</sup>

### The Future of Paediatric Neuropsychology in Hong Kong

The complexity of the neurocognitive and psychosocial development of children with epilepsy requires a highly skilled sub-specialty in applied psychology, to join force with the multidisciplinary teams in Hospital Authority, for the betterment of the holistic care of the patients. The article has laid out the 'why' of clinical neuropsychology, but why has it not been developed in public hospitals at present?

The under-development of the sub-specialty may be due to institutional factors. At present, paediatric patients with epilepsy in public hospitals are often referred out to the Child Assessment Service (CAS) of the Department of Health for preoperative assessments,<sup>1,3</sup> but not within Hospital Authority, with its own historical reasons. The pros are that at least the child is being assessed and initial recommendation could be formulated. Clinical data could be drawn to allow systematic audit for the outcome of the surgery by the surgical teams. The cons, however, is that long term follow up by CAS psychologists on remediation and training are limited by the service positioning. In addition, the assessment result in CAS may not be accessible to other rehabilitation specialists such as paediatricians, nurses, speech therapists, occupational therapists and physiotherapists who work in the local hospital the children receive step-down care. Psychologists in the local hospitals, likely constrained by the limited resources for the ever-growing service demand, are likely to be reserved in initiating uncovered new service. The second reason is that there is no provision of specialty training in paediatric neuropsychology in Hong Kong, possibly due to the chicken-and-egg problem of zero opening for such sub-specialty.

The establishment of Hong Kong's first Children Hospital could be a driving force for the development of the sub-specialty. Management may formulate the new service models and clinical protocols, including but not limited to early screening,<sup>20</sup> with active involvement of neuropsychologists (virtually child clinical psychologists) for the best interest of paediatric patients. Due to the lack of local training in such sub-specialty, sponsoring overseas training in paediatric neuropsychology<sup>4</sup> should be seriously considered in long-term planning.

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### Declaration of Interests

None

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