Neuropsychological Assessment for Children after Encephalitis

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Many readers will be familiar with the term encephalitis as the medical name for inflammation of the tissues of the brain usually caused by viral infection. The term neuropsychological assessment may not be so familiar. In this brief article we outline the basics of neuropsychological assessment and its potential use in cases of encephalitis.

Neuropsychological Assessment is an appraisal of the brain’s psychological, that is cognitive and behavioural, functions. An assessment usually consists of 3 equally important parts.

Firstly, taking a comprehensive history from interviews with the encephalitis sufferer and their close relative, and gathering appropriate information from the medical records. This first stage allows us to gain a picture of the type and severity of injury to the brain, what the person was like before the illness and how they have progressed.

The second stage involves the use of standard psychological tests to examine how specific functions of the brain are working. The main areas of cognitive functioning which should be assessed are attention, memory, visual perception, reasoning and verbal ability. For each function a number of different tests should be used. There is no point relying on just one test of attention, for example, when attention is such a complex system and is known to have different areas and levels of working within the brain - for example, speed of thinking, sustaining concentration, keeping to one thing at a time, being able to work in a busy or noisy environment with other things going on around you.

An individual’s IQ (intelligence quotient) has little relevance to brain function or neuropsychological assessment. However, the standard tests of intelligence, which are used to calculate the IQ, can be very useful if their results are interpreted in terms of brain function, rather than numerical estimates or IQs. An appropriate and comprehensive neuropsychological assessment yields information on how the brain is working, information which cannot be obtained in any other way.

The third part of assessment is the psychologist’s opinion and report. The test results are now considered in relation to the person’s history - both before and since the illness. For example, do the test findings make neurological sense, does the pattern of difficulties shown fit with what one would reasonably expect to find after this type and severity of illness. If not, were there any problems before the illness, such as dyslexia, learning or behaviour difficulties, or other injury to the brain, which may have increased the person’s vulnerability and caused disproportionately severe symptoms? The effects of two or more injuries to the brain, whatever their cause or severity, will be cumulative.

Having decided on the person’s present condition, the psychologist should then be in a position to make recommendations for helping further rehabilitation or education, for example. The so-called “strengths and weaknesses” of the person’s assessment should indicate the main problem areas (e.g. attention and memory), the nature of the difficulty (e.g. distractibility) and, by logical application of knowledge on how brain functions are organised, the best ways in which to approach the problems (e.g. working in a quiet room; one-to-one practice in learning how to learn).

The importance of psychological assessment after encephalitis is not a new idea. Anderson (1923) reported the effects of encephalitis on children and stated that “intelligence has suffered surprisingly little impairment” and the children could be
regarded as “moral rather than mental imbeciles”. However, Anderson went on to say that results of psychological testing “so far have failed to confirm our first impression...the five children so far examined .... have all been on the borderland of mental defeat”.

That example shows how an interpretation of intact intelligence may lead to the misattribution of behavioural problems. With the benefit of appropriate neuropsychological assessment these authors might have chosen instead to view the behavioural effects of encephalitis as due to deficits of mental processes such as attention, reasoning, learning, memory and regulation of actions as a direct result of injury to the brain.

Of crucial importance when assessing children is consideration of how the disease interrupts developmental process. The child’s brain is still developing and neural connections are not yet fully formed. Damage to the brain before it is mature disrupts the normal patterns of connection. Some connections may never form whilst anomalous connection may take their place. For this reason age at injury needs to be considered carefully.

Time since injury is of critical importance to understanding behaviour problems. Abnormal development of the brain after early injury may lead to the child “growing into problems” often years after injury. Such behaviour problems are likely to be a combination of impaired cognitive functioning and poor behavioural, or self, control caused by the brain damage.

Auden (1922) described the case of a girl suffered from “a fit” at the age of five. In the years following the illness she was described as “restless and fidgety without any concentration” and imperative in her demands. In 1921, three years after illness:

“Her conduct is marked by foolishness and a complete lack of appreciation of the results of her actions. The children annoy her by calling her “barmy”. She retaliates by hitting out wildly at the nearest, and possibly quite innocent, child. Her behaviour finally became such a nuisance to the neighbourhood that she was readmitted to the infirmary.”

Similarly, Anderson (1923) described the case of a 9 year old boy:

“One month after recovery he ceased to sleep during the night, and falling asleep in the early morning would remain sound asleep till the afternoon. His behaviour at night is described by the mother as having been ‘terrible’. He tore the bed clothes, picking the blankets and sheets into incredibly small pieces, jumped from one end of the bed to the other, pulled down the hangings, insisted on getting up to go and play, climbed over the furniture, and made so much noise that the neighbours complained and the landlord threatened to have them ejected from their house.”

Reports of that time not only contained descriptions of the children’s behaviour but also commonly stated that the children’s intelligence was intact and that they underwent a quite separate behavioural and moral deterioration. Bond and Partridge (1926) described “a wedging apart of fairly intact intellect from deteriorating moral habits” in children following encephalitis. They also describe children “whose bright minds go along aiding, instead of preventing, immoral and foolish actions”.

Conclusion:

Neuropsychological assessment is necessary to accurately define the nature and severity and problems in cognition and behaviour after encephalitis. This is in turn necessary for the proper understanding and management of changes in behaviour after the disease. In children a neuropsychological assessment must take into effects on normal developmental processes and for this reason repeat assessments years after the illness are appropriate in order to plan appropriate education interventions.