

Are acquired demyelinating syndromes of the central nervous system underdiagnosed in Canadian children?

A six-year-old girl presents with acute visual loss (optic neuritis). Her magnetic resonance imaging scan shows multiple white matter lesions, consistent with demyelination. Will she recover completely? Will she continue to experience recurrent episodes of demyelination and, thus, meet the criteria for the chronic autoimmune disease, multiple sclerosis (MS)?

The incidence of acute demyelination of the central nervous system in Canadian children is unknown. While not all children initially affected will go on to experience recurrent attacks characteristic of MS, their future

remains uncertain. The risk of subsequent MS and the clinical, biological and neuroimaging predictors of MS risk have yet to be defined.

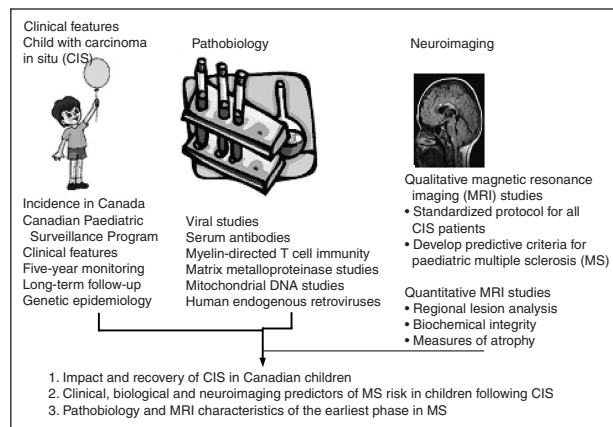
Parents and health care professionals often do not consider MS a possible diagnosis based on an initial demyelinating event. The advent of disease-modifying therapies for MS and the recent evidence of improved long-term outcome associated with early therapy initiation emphasize the need for prompt diagnosis and coordinated care for children affected with MS.

LEARNING POINTS

- The incidence of acquired demyelination of the central nervous system in Canadian children is likely under-recognized.
- Clinical features of acute demyelination include the following:
 - optic neuritis;
 - transverse myelitis;
 - hemisensory or hemimotor syndromes; and
 - cerebellar or brainstem dysfunction;
 either alone (monosymptomatic carcinoma in situ), in combination (polysymptomatic carcinoma in situ), or associated with encephalopathy (acute disseminated encephalomyelitis).
- Current research indicates that acute demyelination may involve stimulation of immune cells by one or more environmental agents (ie, viruses) and misdirection of these cells to attack myelin in individuals with genetic or target-organ (brain and spinal cord) susceptibilities.
- Following an initial demyelinating attack, the risk of MS in children is unknown, as are the environmental, immunological and neuroimaging features predictive of this outcome.

LOOKING AHEAD

Identification of children with acute demyelination is made possible through the Canadian Paediatric Surveillance Program. In addition, an extensive network of investigators in 17 cities across Canada is conducting a more detailed, prospective, five-year study of demyelination in Canadian children. Together, these projects will define the incidence of acquired demyelination of the central nervous system in Canadian children and the proportion of these children in whom MS is subsequently diagnosed. Epidemiological data gathered will address whether children with demyelination have an increased 'genetic load', as defined by a positive family history for MS. Pathobiology studies will characterize the white matter proteins targeted by the immune system, and the features of the brain and spinal cord tissue that may predispose to MS risk. Finally, detailed images of the brain will be obtained to document the appearance of the white matter in children with demyelination and define imaging features that are associated with MS risk. Advanced magnetic resonance imaging technology will be used to explore the critical question of whether the white matter of children destined for MS is fundamentally different from that of their healthy, age-matched peers. The



study is funded by the Multiple Sclerosis Scientific Research Foundation.

Ultimately, identification of the key to 'turning MS off' may rest with knowledge of the processes involved in initiating the disease in the first place. The present study is uniquely able to search for this key. For additional information on this study, contact Brenda Banwell MD FRCPC at The Hospital for Sick Children (1-866-269-9553).

The Canadian Paediatric Surveillance Program (CPSP) is a joint project of the Canadian Paediatric Society and Health Canada's Centre for Infectious Disease Prevention and Control that undertakes the surveillance of rare diseases and conditions in children. For more information visit our Web site at <www.cps.ca/english/cpsp> or <www.cps.ca/francais/pcsp>.