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Treatment for Children with Multiple Sclerosis

Authors: Janet Nzisa, Editorial Assistant

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The current treatments for children with multiple sclerosis (MS) was a theme explored in a session at this year's conference of the European Committee for Treatment and Research in Multiple Sclerosis (ECTRIMS), which took place on the 26th–28th October 2022. The speakers shared their insights into the management and clinical consequences of MS in children, and discussed perspectives as to why immunomodulatory treatment is different in children with MS. The session was a Rogier Hintzen Memorial session, dedicated to the memory of the renowned Professor of Neurology from Rotterdam, the Netherlands, whose research focused on MS and neurological disorders of the central nervous system and who was one of the first neurologists to recognise the special needs of children with MS.

MANAGEMENT OF THE CLINICAL CONSEQUENCES OF A CHILD WITH MULTIPLE SCLEROSIS

Paediatric MS is linked to higher lesion load and greater tissue loss compared to adult-onset MS, resulting in severe cognition and psychosocial outcomes later in life. The first session, presented by E. Ann Yeh, Department of Pediatrics (Neurology), SickKids Research Institute, Hospital for Sick Children, University of Toronto, Canada, covered the consequences of paediatric MS and management considerations. Yeh presented a study demonstrating a long-term downward trajectory in cognition in patients with paediatric-onset MS, which was more pronounced compared to patients with adult-onset MS. Yeh emphasised that the cognitive impairment is greater through time in patients with paediatric-onset MS and declines faster as the patients get older. The consequences of this decline in cognition lead to depression and fatigue. Approximately 30–50% of children with MS experience depression, and up to 75% of children with MS suffer from fatigue. Furthermore, studies have demonstrated that the same trajectory observed in cognitive decline is also observed in fatigue and depression, with patients experiencing this severely and more frequently as they get older.

In order to combat this decline in cognition and psychosocial outcomes in patients with MS, Yeh explained that it is important to identify factors that are associated with poor outcomes in these patients. One of the factors linked to poor outcomes, especially in female paediatric patients with MS, is obesity. Several studies have shown that an earlier age of disease onset is observed more frequently in female paediatric patients who are overweight. Yeh highlighted that certain lifestyle factors may change the course of the disease. Similar to obesity, diet plays an important role in the risk of MS. A study demonstrated that a 10% increase in vegetable intake is linked to a decrease in the risk of MS. Furthermore, the study

associated a 10% increase in caloric intake from saturated fats to threefold the increase in relapse risk. A limitation of this study is that the patients recorded their food intake themselves, which could be slightly flawed and may affect the results of the study.

Another modifiable factor in the MS trajectory is physical activity. Yeh and their team carried out a cross-sectional study that demonstrated an association between lower physical activity and a higher disease burden in paediatric MS. One of the elements they observed was that the children with MS did little moderate to vigorous physical activity. The Canadian Physical Activity Guidelines recommend that children partake in approximately 1 hour of moderate to vigorous physical activity a day; however, the children with MS in this study performed less than 2 minutes of physical activity a day. Interestingly, vigorous or moderate physical activity is linked to lower lesion volumes and better brain volumes. Moreover, higher physical activity is linked to better psychosocial outcomes. According to another study presented at the session, 15–30 minutes of moderate to vigorous activity weekly was associated to improved depression and fatigue scores in paediatric patients with MS.

Yeh concluded the presentation by encouraging healthcare professionals to intervene, not only by prescribing medication but also by setting physical activity and lifestyle goals in paediatric patients with MS to improve the long-term outcomes in these patients.

IMMUNOMODULATORY TREATMENT IN CHILDREN WITH MULTIPLE SCLEROSIS

Immunomodulatory treatment is used in both paediatric and adult patients with MS. However, children with MS have a higher rate of disease relapse compared to adults. Additionally, studies have demonstrated that paediatric patients have a higher T2 lesion at the initial phase of the disease compared to adults. Furthermore, children with MS have a higher percentage of cognitive difficulties such as depression and fatigue.

In the second part of the session, expert Kevin Rostásy, Department of Pediatric Neurology, Children's Hospital Datteln, University Witten/Herdecke, Germany, discussed immunomodulatory treatment in children. Rostásy shared data from a study confirming that axonal injury was greater in children with MS, even at the early stages of disease onset, compared to adults. "Other mechanisms are at play at the initial phase of the disease," said Rostásy. They went on to emphasise that there is a broader differential diagnosis that needs to be considered in children, especially in those younger than 10 years of age, compared to adults. Among the conditions that mimic the presentation of MS are neurosarcoidosis, mitochondrial disorders, central nervous system vasculitis, and more.

Rostásy presented data from a recent study that compared the early and late onset of disease in paediatric populations, which demonstrated that the early onset of MS before the age of 10 years took longer to develop into the secondary progressive stage in the paediatric population with this condition.

There are a few studies that cover the treatment of MS in paediatric populations, with most of the current research based on the efficacy and safety profile of the available medications. In the past decade, disease-modifying treatments have been increasingly administered to paediatric patients with MS.

Despite the ongoing research, Rostásy highlighted that "there are many unresolved issues in the treatment of children with MS." These include the lack of long-term data, lack of safety profile in groups younger than 10 years, and no clarity of the treatment approach in children with MS before puberty. Rostásy concluded their presentation by highlighting that there are cognitive differences in the brains of children and adolescents with MS compared to adults with the same condition.