

## Symposium: Neurocognitive Late Effects after Childhood Cancer

Organized by : Ingrid Tønning Olsson

Chair: Ingrid Tønning Olsson

Survival rates for childhood cancer have increased. Today approximately one out of 640 young adults is a survivor of childhood cancer. Neurocognitive late effects are common, e.g. impaired cognitive processing speed, especially among survivors of brain tumours and leukaemia. This symposium includes a brief overview of the research field and presentations of studies covering 4 topics: longitudinal development, fatigue, brain structures vulnerable to radiotherapy, and national rehabilitation guidelines.

### Presentation 1:

**Title:** Neurocognitive Development after Childhood Cancer

**Presented by:** Ingrid Tønning Olsson, Neuropsychologist, PhD, Skånes universitetssjukhus, Lunds Universitet

**Abstract:** This presentation includes an overview of the research field. Background: Survivors of Paediatric Brain Tumours (PBT) are at risk for cognitive decline. Associated factors are female sex, young age-at-diagnosis, hydrocephalus, and treatment with whole brain radiation therapy (WBRT). Aim: Identify factors associated with a negative neurocognitive development after PBT. Method: Retrospective neurocognitive data were extracted from medical logs for 151 survivors of PBT on verbal (Wechsler VIQ) and non-verbal reasoning (PIQ), processing speed (PSI), and short-term memory (FDI). Multilevel linear modelling was used to evaluate rate of decline. Results: A general pattern of decline of 0.6-2.5 IQ-scores per year was found. Factors associated with faster decline were placement of ventriculo-peritoneal (VP) shunt, young age-at-diagnosis, diagnosis of non-astrocytoma, and high intracranial pressure at diagnosis. Conclusion: Survivors of PBT show a decline in IQ-scores unconsidered treatment. Faster decline is associated with WBRT, VP shunt, and young age at diagnosis.

### Presentation 2:

**Title:** Fatigue after childhood cancer – overview of theory and measurement

**Presented by:** Elin Irestorm, Neuropsychologist, PhD, Lunds Universitet

**Abstract:** Elin Irestorm will discuss cancer-related fatigue, with a particular focus on survivors of childhood cancer. Cancer-related fatigue is a type of fatigue associated with either cancer or cancer treatment, and it has consistently been found to be one of the most prevalent and distressing symptoms in survivors of childhood cancer. The development of a biopsychosocial model of cancer-related fatigue has been proposed as high-priority research, together with longitudinal studies to uncover the course of fatigue over time. Another matter of concern is the inclusion of fatigue in the psychological follow-up protocols for survivors of childhood cancer. Irestorm will give an overview of the theoretical framework behind the diagnosis cancer-related fatigue and critique against it, differential diagnostic challenges, and methods of measurements. She will also report recent studies on the relationship between fatigue and cognitive abilities in survivors of childhood cancer.

### Presentation 3:

**Title:** Neurocognition before and after radiotherapy towards vulnerable brain structures

**Presented by:** Helena Söderström, Neuropsychologist, PhD Student, Uppsala Akademiska Sjukhus, Uppsala Universitet

**Abstract:** Aim: Describe neurocognitive changes before and after different radiotherapy (RT) modalities towards different vulnerable brain structures. Background: Survivors of childhood brain tumours are at high risk for neurocognitive sequelae, especially after radiotherapy. There is a need to enhance and better understand how different RT modalities and RT doses towards vulnerable brain structures impacts neurocognitive development. Method: 50 paediatric brain tumor survivors that have received different RT modalities (photon, proton and gamma knife). Clinical characteristics, neuropsychological function before and after treatment and RT doses towards vulnerable brain structures were collected retrospectively. Results: Neurocognitive problems were apparent already before RT and progressively aggravated over time after RT. Whole brain radiotherapy and RT towards vulnerable brain structures were negatively correlated with declines in processing speed, working memory and perceptual performance. Conclusion: Neurocognitive problems were apparent before RT. Several brain structures seem important for RT induced neurocognitive decline.

#### Presentation 4:

**Title:** Neurocognitive rehabilitation after cancer in childhood

**Presented by:** Catherine Aaro Jonsson, Neuropsychologist, PhD, Barn och Ungdomshabiliteringen, Region Jämtland Härjedalen

**Abstract:** Background: Quality of life is often compromised among survivors of brain tumours compared to other types of childhood cancer. Within a state funded project aimed to support neurocognitive rehabilitation after childhood cancer, we evaluated compliance with Swedish national guidelines in the region of Uppsala/Örebro. Method: Survey and following interview with each county. Results: We found areas of expertise but lack of formalized structure. Neuropsychologists/psychologists were understaffed and access to special educators was rare. Conclusions: Responsibility for guideline interventions needs to be defined both at a regional and a local level. Neurocognitive rehabilitation units need to be formed, as a complement to existing oncological teams. Collaboration between those units needs to be established, as well as forums for sharing knowledge. A well-defined screening of cognition and psychosocial functions should be obligatory, followed by increased individualized interventions for those in need.