LATE EFFECTS IN CHILDHOOD CANCER SURVIVORS

The Adult Life After Childhood Cancer in Scandinavia (ALiCCS) study

SUMMARY

The population of childhood cancer survivors is rapidly increasing as a result of the remarkable success of new and better treatments. Based on modern treatment modalities, close to 80% of children with cancer in the Nordic countries are alive five years after diagnosis with the majority cured. However, the success comes at a price as survivors face a significant and often uncharacterised range of late effects, many of which become clinically apparent even decades after treatment and cure of the initial cancer. With progressively increasing survival rates, this highlights the importance of minimising damaging treatments, exploring possible late effects, and targeting survivor follow-up.

The main objectives of the studies included in this thesis were to investigate the overall long-term morbidity in general and the endocrine morbidity in particular following childhood cancer. The studies were based on the unique Adult Life after Childhood Cancer in Scandinavia (ALiCCS) cohort including all children with cancer diagnosed in the Nordic countries since the start of the cancer registries and a randomly selected comparison cohort from the five Nordic background populations.

We found that survivors of childhood cancer had an overall doubled risk of being hospitalised for a broad range of somatic diseases affecting all major organ systems. The risk persisted throughout life and for each additional year of follow up, approximately 3 of 100 survivors were hospitalised with a new disease beyond background rates. The pattern of excess hospitalisations among survivors were dominated by diseases of the nervous system, endocrine system, digestive system, and respiratory system. The morbidity pattern was highly dependent on the type of childhood cancer with highest risks in survivors of neuroblastoma, hepatic tumours, and tumours of the central nervous system (CNS).

In a study focusing on endocrine late effects, we found a five-fold increased risk of any endocrine disorder and an absolute risk that did not plateau with age. Survivors were at increased risk for all 22 endocrine disorders included in the study. Although pituitary hypofunction, hypothyroidism, and gonadal dysfunction accounted for 61% of the excess endocrine disease pattern in survivors, the remaining outcomes included a broad range of endocrine late effects. The highest risks were observed in survivors of leukaemia, CNS tumours, and Hodgkin lymphoma. In addition, children diagnosed with cancer at age 5–9 years were at relatively higher risk.

Clinicians should be aware of this complex pattern of late effects as many of these morbidities impair quality of life and ultimately increase mortality. Thus, our results underscore the need for implementation of long-term targeted follow-up of survivors in order to improve prevention, detection, and management of treatment-induced morbidities.