

increased risk of second cancer, and endocrinological, neuropsychological, and psychosocial side-effects. The risk of second cancer have been related to intensive epipodophyllotoxin schedules, G-CSF therapy, and low activity of the enzyme thiopurine methyltransferase (the primary determinant of 6-mercaptopurine). Use of organ protectors during therapy, cryopreservation of semen and ovary tissue, and screening for endocrine and other side-effects that can be counteracted by interventions are some of the approaches applied to improve the quality of life for the long-term survivors. In addition, there is promising development in methods (including monitoring of in-vitro chemosensitivity, pharmacogenetics, and minimal residual disease) that can differentiate between clinically chemoresistant and -sensitive patients to allow for more individualised therapy, and thus avoid overtreatment. Future titration of treatment intensity should optimally reflect both the severity of the disease and the CTx-tolerance of the normal tissue to secure not only cure, but also a normal life for the survivors.

53

INVITED

Comparative assessment of long-term functional outcome in patients with soft tissue sarcoma of the extremities

P. Tunn. Humboldt University Berlin, Surgery and Surgical Oncology, Berlin, Germany

Background: Limb-saving therapy has become the treatment of choice in soft tissue sarcomas of the extremities during the past two decades. Reconstructive procedures as part of a multimodal treatment concept have abolished primary amputation without compromising survival and local recurrence-free survival. Beyond survival, there are few data evaluating physical impairment and disability in the context of quality of life, an aspect becoming increasingly important in the growing proportion of long-term survivors. When the complex medical treatment is concluded, patients must often accept physical disability after resection of soft tissue sarcomas of the extremities, which can lead to long-term limitations in the personal and social sphere.

Methods: The assessment of a treatment outcome can be made at the most varied levels (physical, mental, cosmetic, social etc.). The complex concept of disability was initially defined by the WHO with the "International Classification of Impairments, Disabilities and Handicaps" (ICIDH). The anatomical damage (impairment) was distinguished from functional limitation (disability) and social disadvantage (handicap). Following this, it is apparent that the MSTS score reflects mainly "impairment", the TESS (Toronto Extremity Salvage Score) "disability" and the RNL index (Reintegration to Normal Living index) "handicap". More than 200 patients with soft tissue sarcoma of the extremities were included in this retrospective analysis. The three scoring systems were analyzed according to gender, tumor site, age, type of surgery and self-assessment of disability.

Results: All of the patients with objective anatomical deficits were well integrated socially and the function of the affected limb was also assessed as good. No gender-specific differences were found in the three scores. This finding can most probably be explained by the equal social status. The age grouping related to the occupational situation. Children and adolescents rated themselves better in the TESS and RNL index compared to their assessment in the MSTS score. This result could be attributed to the fact that young patients demonstrate a better adaptation to a changed physical situation and learn to live with their disability. Older patients were assessed worse in the MSTS score on the one hand, and also rated themselves more poorly in the TESS compared to the RNL index. The patients' self-assessment (TESS, RNL index) yielded better results through all subgroups than the evaluation by a physician's clinical examination (MSTS score). Radiation therapy and isolated limb perfusion showed a higher rate of long-term complications related to specific treatment modalities.

Conclusion: By using different standardized tools, it could be demonstrated that physical disability is perceived to only a small degree by the patients, despite the anatomical impairments after multimodal therapy of soft tissue sarcoma of the extremities. Parallel recording of these scores allows a much better evaluation of the quality of life after multimodal therapy, taking into account tumor site and patient age. Without the use of a patient self-rating scale, "objective" measurements by the physician tend to overestimate the impact of anatomical impairment. Combining different tools for outcome assessment provides an improved understanding of the often complex post therapeutic situation of our patients.

54

INVITED

Long-term cancer survivorship issues: Is there a role for CAM?

P. Mansky¹, K. Hoffman², L. Gerber³, G. Chrousos⁴, S. Steinberg², C. Mackall². ¹National Institutes of Health, National Center for Complementary and Alternative Medicine, Bethesda, USA; ²National Institutes of Health, National Cancer Institute, Bethesda, USA; ³George Mason University, Center for Chronic Illness and Disability, Fairfax, USA; ⁴National Institutes of Health, National Institute of Child Health and Human Development, Bethesda, USA

Background: Complementary and Alternative Medicine (CAM) use in cancer survivors has been increasing, especially in the area of mind-body medicine. We recently conducted a study comprehensively assessing health and musculoskeletal function in survivors of pediatric sarcomas. Results will be summarized and implications for the study of the effects of mind-body interventions in cancer survivors will be discussed.

Patients and Methods: Thirty-two individuals treated for Ewing sarcoma family of tumors (ESFT), rhabdomyosarcoma (RMS) or non-rhabdomyosarcoma soft tissue sarcomas (NR-STS) with multimodality therapy were enrolled on this cross-sectional study. Participants underwent assessments of musculoskeletal functioning, cardiac function, metabolic and lipid analyses, renal and gonadal function and psychological evaluation.

Results: We previously reported that this cohort of sarcoma survivors shows decreased musculoskeletal functioning, elevated body fat index, hyperlipidemia and chronic psychological distress. Recent analyses demonstrated a higher prevalence of the metabolic syndrome (OR 4.29 95% CI: [1.50, 11.21]), defined as 3 or more metabolic syndrome traits (MST) in subjects aged 20–39 years. Analysis of individual MST demonstrated higher prevalence of hypertension (OR 2.61 95% CI: [1.20, 5.59]), hypertriglyceridemia (OR 3.63 95% CI: [1.75, 7.60]) and male visceral abdominal obesity (20–39yo OR 4.63 95% CI: [0.91, 21.63], 40–59yo OR infinity). In male subjects, total testosterone declined ($p = 0.0027$) as the number of MST increased. Average ($p = 0.014$) and maximum ($p = 0.021$) physical activity levels decreased as the number of MST increased.

Conclusion: An increased number of MST especially in younger sarcoma survivors, combined with decreased physical functioning, dyslipidemia and psychological stress suggest an increased risk for cardiovascular disease, even many years after completion of sarcoma therapy. A recently initiated study will compare the effect of a Mind-body intervention (Tai Chi Chuan) and aerobic exercise on stress and physical fitness in cancer survivors.

Award Lecture (Mon, 24 Sep, 17:00–17:45)

Pezcoller Foundation/FECS recognition for Contribution to Oncology

55

Pezcoller/FECS Award

Perspectives on virus–host interactions and tumour development

L. Chicco-Bianchi. Università di Padova, Director Istituto di Oncologia, Padova, Italy

It is estimated that approximately 20 percent of human cancers are linked to infectious agents. Beginning with the identification of Epstein-Barr virus in Burkitt lymphoma cells in 1964, intensive research into the connections between viral infections and cancer have led to the identification of 6 human tumour viruses, and continued research is likely to uncover new agents. Dissection of the interactions between tumour viruses and host cells have yielded significant advances in our understanding of how these oncogenic infectious agents elude the immune system, persist in their host, and promote the step-wise chain of events that results in neoplastic transformation.

While tumour viruses are quite ubiquitous in many geographic areas, the development of the associated neoplastic diseases represents a rare event. Furthermore, a prolonged incubation period (years or decades) from the initial virus infection is usually needed before the appearance of clinically detectable associated tumour. Clearly, multiple co-factors following the primary exposure to the infectious agent must be at work to cause cancer. Some experimental and clinical findings, focused mainly on Human T-cell Leukemia virus, type 1 and Kaposi's sarcoma-associated human herpes virus-8, will be discussed to illustrate the complexity of the virus–host interplay in oncogenesis.