Progresses in musculoskeletal oncology and future perspectives

Andrea Angelini, Pietro Ruggieri*

Department of Orthopedics and Orthopedic Oncology, University of Padova, Italy
*E-mail: pietro.ruggieri@unipd.it

Abstract
Sarcomas represent less than 1% of adult cancers and they account for approximately 21% of pediatric malignancies. The heterogeneity of these tumors results in variable responses to generalized therapeutic strategies. In the last four decades, significant advances in the treatment of patients with bone and soft tissue sarcomas have been made. Historically, the prognosis of these patients was poor due to the aggressiveness of tumors and their ability to reach large volume, resulting in substantial deformities and disabilities. Since the advent of chemotherapy (adjuvant and neo-adjuvant protocols), the curves of survival changed dramatically. On the other hand, concurrently advances in surgical management, in imaging and diagnostic techniques, and both local and systemic adjuvant treatments, have determined a significant improvement of limb sparing surgery as successful treatment with a meaningful quality of life.

In recent years, the greatest medical advances in the management of malignant musculoskeletal tumors have been made in high-dose chemotherapy and other related treatments, including target therapies and immunotherapy. In the field of radiation therapy, the use of protons and carbon ions is recognized to offer considerable advantages compared to conventional photon-based radiotherapy protocols. Some of the most recent innovations in surgery include biological and prosthetic reconstructions, together with computer-assisted navigation and 3D-printed implants. Innovations in other fields of oncology that has been required by surgeons include the assessment of surgical margins, new classifications, the evaluation of function and quality of life, and adequate follow-up protocol. For future research, prospective, multi-institutional, large registries are required to answer open questions.

Keywords
Trends; Innovation; Musculoskeletal Oncology; What’s new; Sarcoma; Surgery; Radiation; Orthopaedics