Microscopic Tumor Emboli as One of Important Prognostic Factors in Stage-II Osteosarcoma

Piya Kiatisevi, M.D.[1], Science Metadilogkul, M.D. [1], Worapitak Thaisitti, M.D. [2], Akarathan Jitnuyanont, M.D. [3], Numphung Numkarunarunrote, M.D. [4], Bhasanan Sukunthanak, M.D. [1], Voranuch Thanakit, M.D. [5]

[1] Orthopaedic Oncology Service, Institute of Orthopaedics, Lerdsin General Hospital, Bangkok, Thailand

[2] Pediatric Oncology Service, Department of Pediatrics, Lerdsin General Hospital, Bangkok, Thailand

[3] Medical Oncology Service, Department of Internal Medicine, Lerdsin General Hospitak, Bangkok, Thailand

[4] Musculoskeletal Radiology Service, Department of Radiology, Chulalongkorn University, Bangkok, Thailand

[5] Musculoskeletal Pathology Service, Department of Pathology, Chulalongkorn University, Bangkok, Thailand

Our objectives are to assess outcome and prognostic factors for stage-II osteosarcoma patients in our hospital and to ask whether microscopic tumor emboli found in specimen influences patient outcome.

We retrospective reviewed 72 consecutive patients with high-grade osteosarcoma who completed treatment with surgery and chemotherapy in our hospital from January 2004 to October 2014. Patient demographic data and factors such as tumor volume reduction after neoadjuvant chemotherapy, tumor necrosis and presence of microscopic tumor emboli in the pathology specimen were studied and analyzed. The tumor volumes were measured under three-dimensional MRI which provided more accuracy. Survival and regression analysis were used to evaluate correlation among parameters and survival.

Of 72 patients, 9 were excluded because of initial pulmonary metastasis, leaving 63 patients with stage-II osteosarcoma in our study. The mean age was 21.7(8-72) years. The mean follow-up period was 28.4(6-114) months. The 5-year disease-specific survival was 69.8% (95%CI, 60.3-90.4%).The presence of tumor emboli independently correlated with poor disease-specific survival on multivariate analysis (RR 1.78; 95%CI 1.07-2.96; p=0.005). Tumor volume reduction less than 40% and the presence of tumor emboli also correlated with poor metastatic free survival (RR 2.34; 95%CI 1.17-4.69; p=0.035 and RR 2.39; 95%CI 1.19-4.47; p<0.001, respectively). In subgroup analysis of patients who had tumor necrosis <90% or tumor volume > 360 ml^3 or who had tumor volume reduction < 40%, the presence of tumor emboli was still associated with poor disease-specific survival (p<0.05).

The presence of tumor emboli is one of important negative prognostic factors for disease-specific survival in patients with high grade, non-metastatic osteosarcoma. It also can predict poor outcome in patients who had tumor necrosis <90% or tumor volume > 360 ml^3 or who had tumor

volume reduction < 40%. This new prognostic parameter may serve as a risk-adaptive therapy in combination with other prognostic factors.