Proton therapy for cardiac sarcoma: a two case series describing the clinical and dosimetric advantages of proton-based therapy

Sergey Berezin Medical Center, Radiation Oncology, Saint-Petersburg, Russian Federation.

Cardiac sarcomas are extremely rare neoplasms with an aggressive behavior. Surgery is the most accepted treatment modality, but total resection is rarely achievable without causing fatal damage to the heart. The purpose of this study was to describe our experience implementing intensity modulated proton therapy (IMPT) for cardiac sarcomas.

We present two patients who received IMPT. The first patient was 55-year-old woman with pleomorphic sarcoma of right ventricle, spreading to pulmonary valve, tricuspid valve and ventricular septum with metastatic spread to mediastinal lymph nodes. The GTV was treated to 66 Gy in 2,2 Gy per fraction. The CTV, including affected mediastinal lymph nodes was irradiated to 60 Gy, using simultaneously integrated boost technique.

The second patient was a 15-year-old boy with pericardial Ewing sarcoma. The CTV was irradiated to 55,8 Gy.

CT scans, MRI scans and treatment were made using respiratory gating at end expiration.
The follow-up period for the first patient is 3 months and for the second patient 4 months. There was no any acute toxicity during treatment and follow-up. CT and MRI scans three months post-radiation demonstrated tumor shrinkage in both cases.

In order to compare dose values, IMRT photon-based plans were generated. IMPT produced lower mean lung dose, lung V5 and V20, heart V40, and dose to contralateral lung than did IMRT.

IMPT in combination with respiratory motion tracking appears to be a technically feasible and clinically well-tolerated local control modality for cardiac sarcomas, providing limited exposure to organs at risk in comparison with IMRT photon plans.

Lung

Spinal Cord

Protons 20% isodose Photons

Protons 10% isodose Photons

Address for correspondence: vorobyov@ldc.ru