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Short- and long-term evaluation of safety of cardiac sarcomas radiotherapy

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Background: Primary cardiac sarcomas (PCS) have a dismal prognosis (a reported median survival of 17 months). Complete surgical resection is the mainstay of treatment, but the resection may be incomplete or impossible because of the local extension. Multimodal treatment (MMT) with chemotherapy and radiotherapy (RT) is widely used in soft tissue sarcomas of the extremities, improving survival, and could be considered for PCS. A consequence of the inclusion of the heart in a radiation field, is acute and chronic radiation-induced heart disease (RIHD). New RT techniques, as Intensity Modulated Radiotherapy (IMRT) reduce the risk, focusing the radiation burden to the target neoplasm and limiting the involvement of the cardiac structures. Nevertheless, RT is rarely used in PCS, because the target lesion is inside the heart, and the heart's movement make difficult to avoid the irradiation of the surrounding structures.
Purpose: Our aim was to report the short and long term clinical and echocardiographic changes in patients (pts) with cardiac sarcomas treated with IMRT.
Methods: Amongst a group of 33 with PCS seen in our hospitals, we reviewed the data of 20 pts (12 males, 8 females) with PCS treated with local RT. The tumors were left-sided in 10 pts, right-sided in 8 and involved both right and left chambers in 2; fifteen patients had received also anthracyclines chemotherapy (CT). For every patient, we reviewed the clinical data and the echocardiograms performed (as for protocol) before and after CT, before starting RT, weekly during RT and at follow-up (FU), performed every 3 months for 2 years, every 6 months for 3 more years, then yearly. The mean age at diagnosis was 48 years (range 22–72). The FU lasted 2 to 131 months (mean 31, median 14). Five pts are alive 29–85 months (mean 57), after ending therapies, the others died of non-cardiac causes.
Results: At the end of RT 3 pts had atrial fibrillation (AF), which was cardioverted with Amiodarone, and one had acute pericarditis, treated with non-steroidal anti-inflammatory drugs for one week. Long-term therapy was not needed. The left ventricular ejection fraction (LVEF) was 52% to 70%, decreased by –1% to –10% in 10 pts. At last FU, LVEF ranged from 52 to 75%; it decreased (compared to baseline) by $>$11% in 1 pt only; global longitudinal LV strain (GLS), available in 8 pts only, was –17%. Amongst the pts with IMRT on the right heart, right ventricular function (evaluated by tricuspid annulus excursion, and right ventricular area shortening fraction) was within normal limits in all both at short and long term FU. There were no cases of constrictive pericarditis or of valvular disease.
Conclusion: In our experience IMRT for heart sarcomas seems to be relatively safe using modern RT techniques, without evident RIHD at long term follow-up. Larger studies are necessary to further evaluate the safety of RT in the multimodal treatment of cardiac sarcomas.