

BACKGROUND

- Doxorubicin is a key component of chemotherapy (CT) used in front-line, curative treatment of sarcoma.
- Compared to the more studied CT cardiotoxic effects in breast cancer, less is known regarding cardiotoxicity development in sarcoma, especially in the short-term post-CT.

CASE

- A 42 y.o. male diagnosed with osteosarcoma of the left tibia was scheduled for CT using Adriamycin.
- The patients had no cardiac risk factors. Medical history included COPD.
- The patient was studied using MRI at baseline, post-CT, and at 6-month follow-up.
- The MRI exam included sequences for evaluating global

cardiac function (ejection fraction (EF) and volumes), regional cardiac function (myocardial strain), diastolic function (early-to-atrial filling ratio (E/A)), and tissue characterization (perfusion, late gadolinium enhancement, as well as T1, T2, and extra-cellular volume (ECV) mappings).

- The results are shown in **Table 1**. The patient had slight decrease in global cardiac function (EF and SV) post-CT, although EF remained >50% up to 6-month.
- Myocardial circumferential and longitudinal strains showed slight increases (in absolute values) post-CT, which returned back to baseline values at 6-month.
- Myocardial T1 showed slight decrease post-CT, which then increased at 6-month. There were minimal changes in T2 values. ECV was maintained post-CT, but slightly decreased at 6-month.
- Increases in T1, T2, and ECV values are typically associated

Table 1. Cardiac parameters at different timepoints

	Pre-Treatment	Post-Treatment	6-month follow-up
EF (%)	59	55	53
EDV (ml)	199	189	196
ESV (ml)	82	84	92
SV (ml)	117	105	104
Ecc (%)	-14	-17	-14
EII (%)	-16	-19	-15
T1 (ms)	1332	1265	1304
T2 (ms)	50	50	51
ECV (%)	35	36	31
E/A ratio	1.4	1.7	1.3

Abbreviations: EF, ejection fraction; EDV, end-diastolic volume; ESV, end-systolic volume; SV, stroke volume; Ecc, circumferential strain; EII, longitudinal strain; T1, myocardial longitudinal magnetic relaxation time constant; T2, myocardial transverse magnetic relaxation time constant; ECV, extracellular volume; E/A, early-to-atrial filling ratio

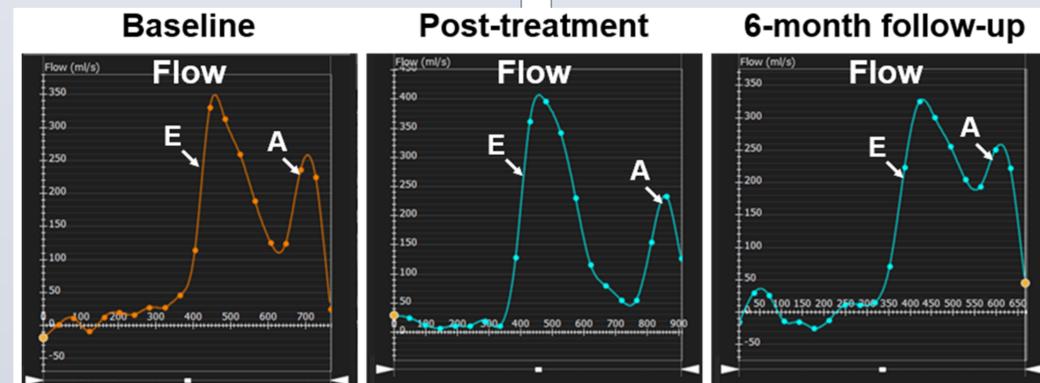


Figure 1. Left-ventricular early-to-atrial filling ratio (E/A) at different timepoints. E/A was always >1. It showed increased overlap between the E and A waves at 6-month post-treatment, reflecting slight diastolic cardiac dysfunction.

with fibrosis, edema, and collagen formation, respectively. LGE and perfusion images were normal.

- E/A was always >1. The ratio increased post-CT, but returned to baseline value at 6-month,

although with increased overlap between the E and A waves, reflecting slight diastolic dysfunction (**Figure 1**).

DISCUSSION

- The implemented techniques were sensitive enough to reveal slight changes in different cardiac parameters post-CT in sarcoma.
- The temporal pattern of these changes could reflect underlying ventricular remodeling and changes in tissue composition in the short-term post-CT, which help the treating physician assess cardiac function and initiate cardioprotective therapy if needed to maintain healthy heart post treatment.

References

1. Ibrahim, Heart Mechanics MRI. CRC Press, 2017

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