

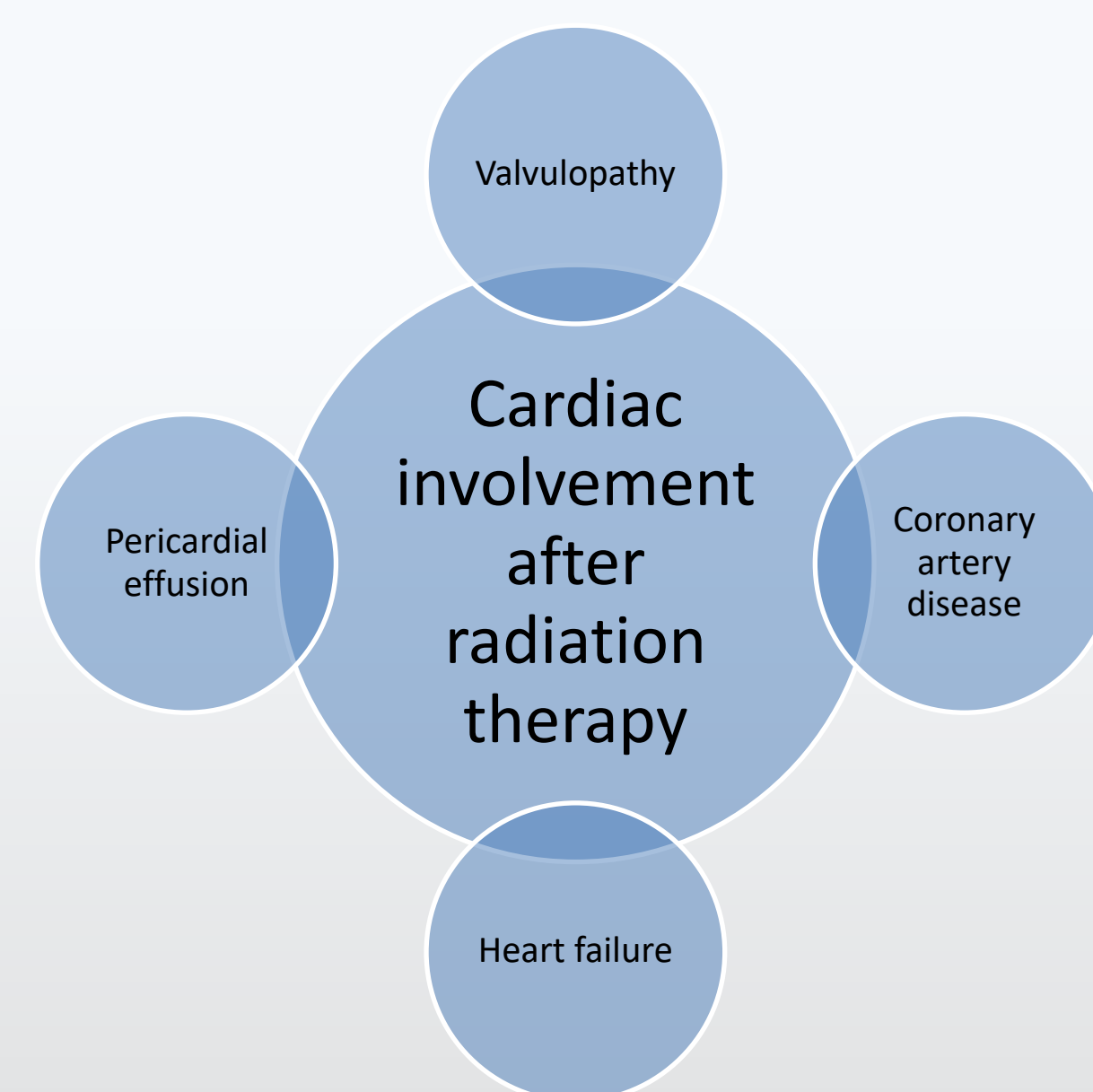
# Radiation induced Valvular Heart disease and Cardiotoxicity induced Cardiomyopathy is common

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## Objective

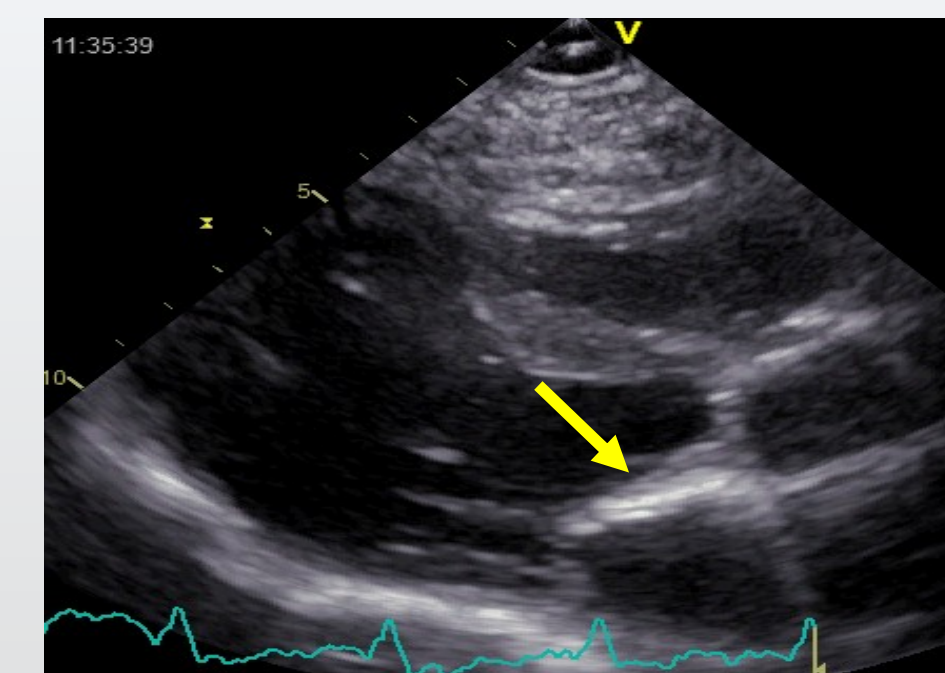
Oncologic treatments allow increasing survival of malignancies such as breast cancer or lymphomas. Mediastinal radiotherapy causes direct linear damage of the myocardium, inflammatory atherosclerosis and early valve calcification depending on the field applied, typically occurring with a latency of 10-20 years after exposure to radiation therapy. This study aims to demonstrate typical findings of radiation induced valve disease (RIVD) in the long-term follow up.



## Patients and Methods

Prospective patients with different malignancies or survivors of childhood cancer, after radiation therapy with or without additional chemotherapy were evaluated due to cardiac symptoms or before further chemotherapy. Transthoracic echocardiography and speckle tracking strain were performed in all pts in our cardio-oncology clinic.

**Image 1.**  
Typical thickening and calcification of the basal and mid part of the anterior mitral leaflet (AMVL, yellow arrow).



## Conclusion

Thickening of mitral valve and calcification of aortic valve are common after thoracic or mediastinal irradiation, typically leading to aortic stenosis and stiffening of the anterior mitral leaflet. After chemotherapy, cardiotoxicity induced cardiomyopathy is often present in addition. After radiation, echocardiography should be performed regularly after 5-10 years. AVR or MVR/MV repair if feasible are accompanied by increased surgical risk. Interventional techniques e.g.: TAVR are an enticing option pending mitral, coronary and peripheral comorbidities.

## Table 1. Patient characteristics

Variable	Male subjects (n=14)			Female subjects (n=37)			p- value
	Mean ± SD or count + %			Mean ± SD or count + %			
Age (y)	58.89	±	9.96	69.40	±	9.27	<b>0.007</b>
Height (cm)	178.83	±	8.13	165.06	±	7.64	<b>&lt; 0.001</b>
Weight (kg)	80.00	±	10.37	69.23	±	14.02	<b>0.019</b>
<b>Transthoracic echocardiography</b>							
LA (mm)	52.36	±	5.84	55.59	±	11.47	0.237
LV (mm)	45.17	±	6.71	43.12	±	7.21	0.397
RA (mm)	51.42	±	8.68	54.79	±	10.95	0.340
RV (mm)	33.00	±	3.41	31.63	±	6.60	0.373
TI Vmax (m/s)	3.01	±	0.32	3.28	±	0.77	0.391

Notes. LA indicates left atrial size; LV: left ventricular size; RA: right atrial size; RV: right ventricular size; TI Vmax: trans-tricuspid annular velocity.

## Results

51 pts were included (37 female, 14 male). The mean age was 66.6 ± 10.4 y (43-82 y). During the study period 17 (33%) of the pts died. In echocardiography, typical thickening and calcification of the basal and mid part of the anterior mitral leaflet, calcific aortic valve sclerosis or stenosis with intervalvular fibrosa thickening of the aorto-mitral curtain and mitral ring calcification were observed in most patients, leading to valve stenosis and/or regurgitation. Mean LVEF was 54% (29-70%). Cardiotoxic cardiomyopathy with reduced systolic LVEF was present in 20 pts (39%), reduced RVF in 15 pts (29%). 36 pts showed typical thickening of the AMVL, sparing the leaflet tips. Thickening and typical sclerosis of the AV cusps was present in almost all pts. Surgical or transcatheter AVR was performed in 14 pts (27%) and 9 pts underwent MVR (18%).

**Figure 1. Type of primary cancer**

