

Risk of coronary artery disease after adjuvant radiotherapy in 29,662 early breast cancer patients: A population-based Danish Breast Cancer Group study

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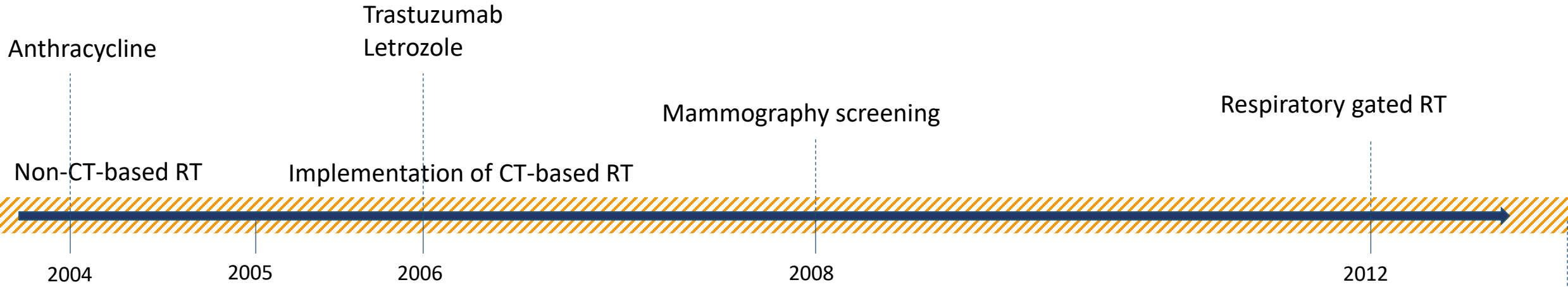
Background

Adjuvant radiotherapy for early breast cancer reduces the risk of recurrence and improves the overall survival

however

Radiotherapy may cause some incidental dose to the heart with subsequent risk of heart disease

Background



DBCg-IMN study
2003-2014



Aim

Investigate the risk of cardiac event in left-sided compared to right-sided patients irradiated during a non-CT-based versus a CT-based period



Cardiac events:

Coronary artery disease \geq 50% stenosis or
Severe valvular heart disease

Material

1999-2016

Danish Breast Cancer Group

Tumor characteristics, treatment, follow-up



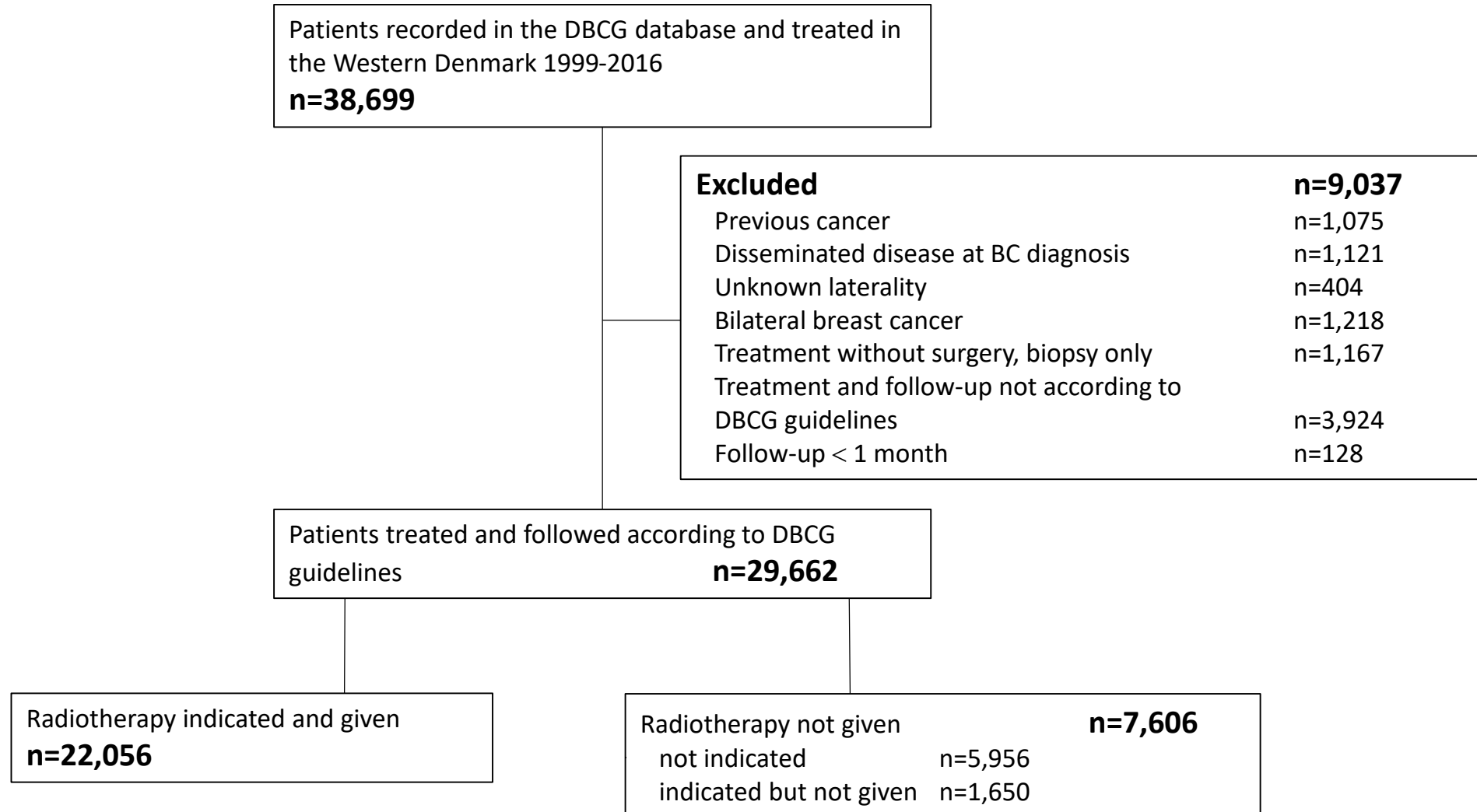
1999-March 2020

Western Denmark Heart Register

CT-CAG, catheter-based diagnostic, valvular heart surgery and CABG

The analyses were based on the first procedure after breast cancer treatment leading to a diagnosis of cardiac event

Cohort



Baseline characteristics

Characteristic	No radiotherapy		Radiotherapy			
	n	% ^a	Left-sided n	% ^b	Right-sided n	% ^b
Total	7,606	26	11,270	51	10,786	49
Year of breast cancer diagnosis						
	3,698	48				
	3,908	52				
Age at breast cancer diagnosis, years						
<40	383	5	492	4	496	5
40-49	1,034	14	1,793	16	1,801	17
50-59	1,638	22	3,464	31	3,339	31
60-69	1,996	26	4,076	36	3,767	35
Surgery						
Nodal status						
			5,776	51	5,449	50
			5,333	47	5,160	48
Unknown	169	2	161	2	177	2

Results

Incidence rate ratio for cardiac event in left versus right-sided irradiated breast cancer patients

Characteristic	Number of cardiac events/number of women		Incidence rate ratio, left vs right (95% CI)	P-value for heterogeneity
	Left-sided	Right-sided		
Total	236/11,270	206/10,786	1.10 (0.91-1.33)	
Year of breast cancer diagnosis				

DIFFERENCE IN FOLLOW-UP

Non-CT-based period 11.1 years (IQR 6.2-15.4)

CT-based period 6.8 years (IQR 4.6-9.5)

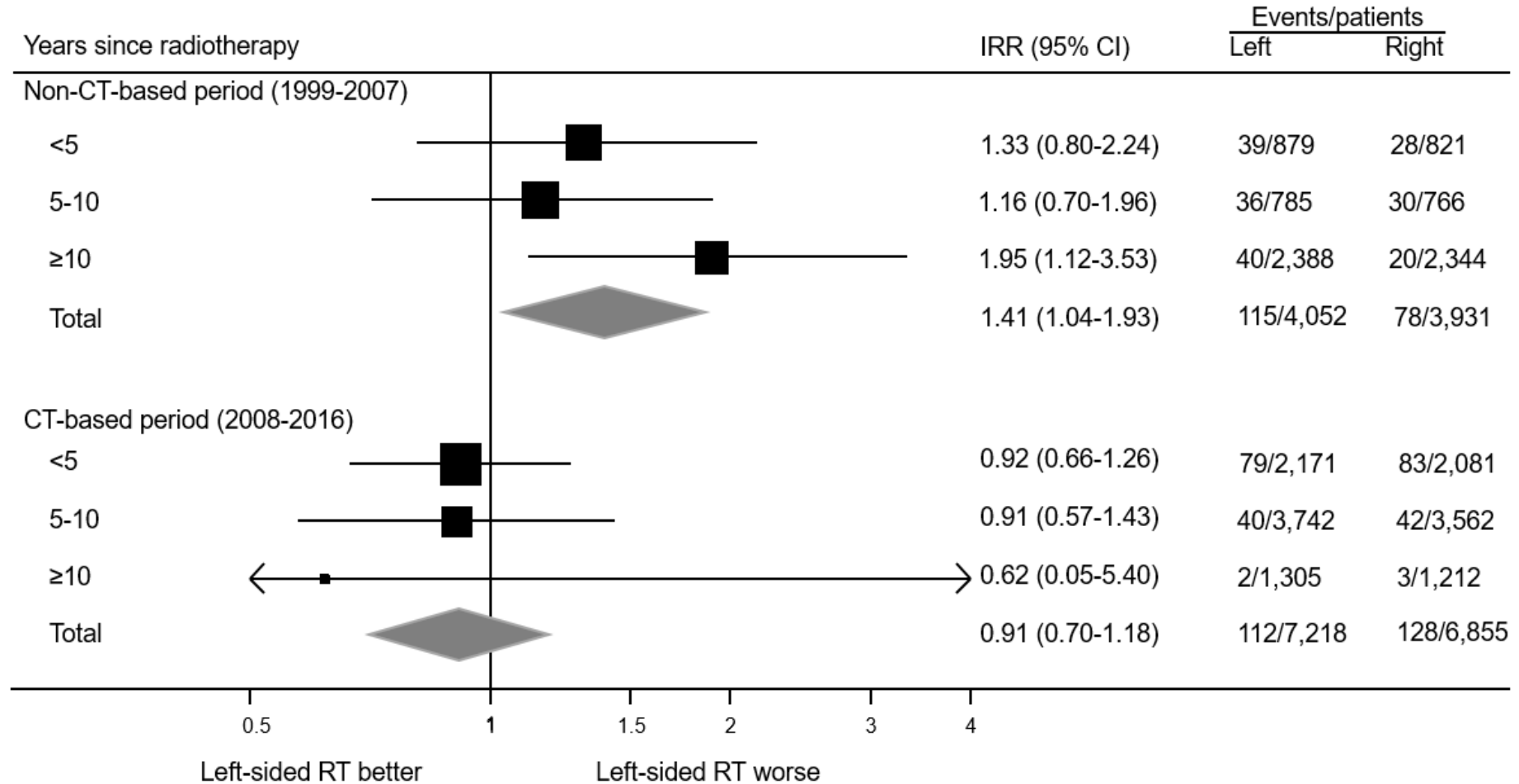
Results

Incidence rate ratio for coronary artery disease and valvular heart disease in left-sided vs right-sided irradiated breast cancer patients

Type of cardiac event	Number of cardiac events/ number of women		Incidence rate ratio, left vs right (95% CI)	p-value for heterogeneity
	Left-sided	Right-sided		
Coronary artery disease^a	204/11,270	182/10,786	1.08 (0.88-1.32)	0.005 ^b
Non-CT-based period, sensitivity ^d	67/4,052	52/3,931	1.26 (0.86-1.85)	0.08 ^e
CT-based period ^f	100/7,218	114/6,855	0.83 (0.63-1.10)	
Valvular heart disease^a	33/11,270	25/10,786	1.27 (0.73-2.22)	0.64
Non-CT-based period ^c	11/4,052	10/3,391	1.07 (0.41-2.82)	
CT-based period ^d	22/7,218	15/6,855	1.39 (0.69-2.88)	

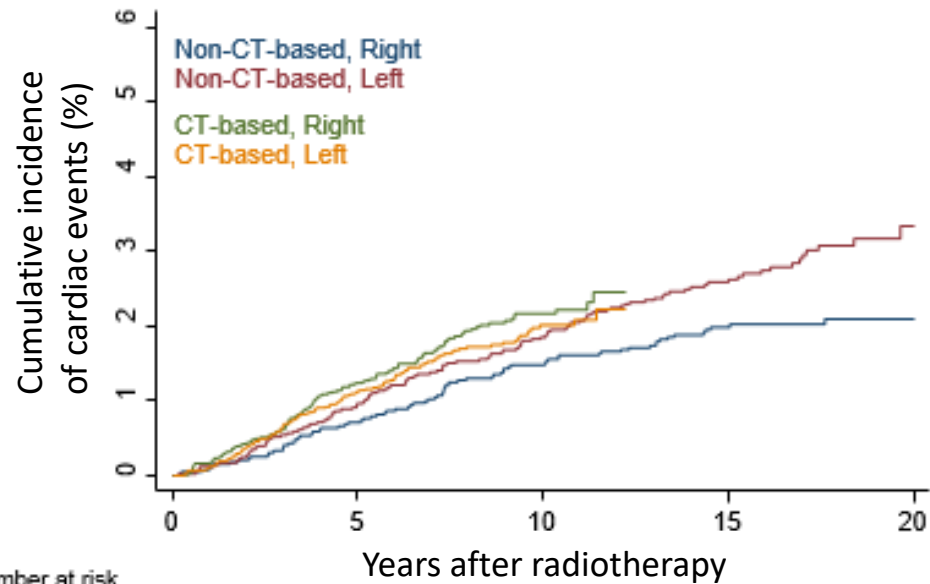
Results

Risk of cardiac event for left vs right-sided irradiated patients over time



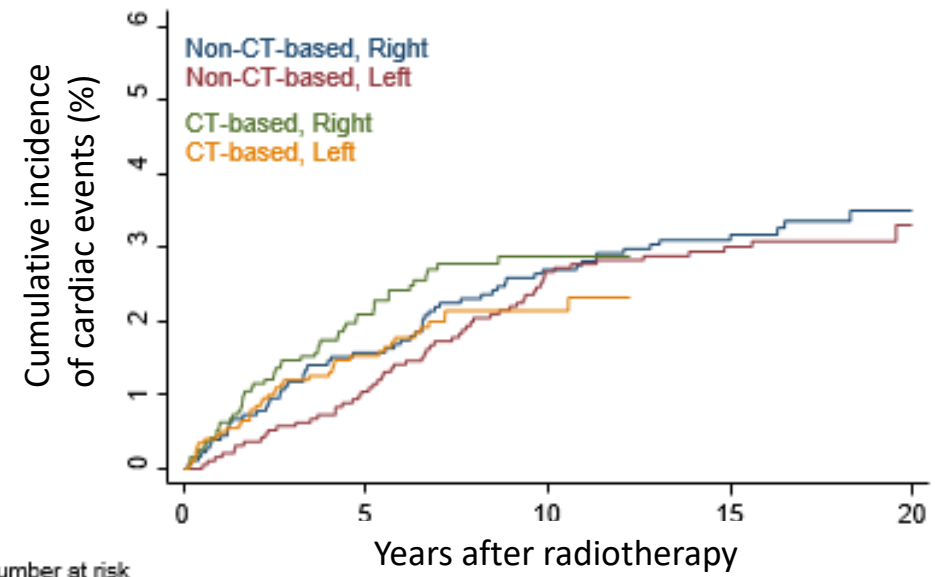
Cumulative incidence

Irradiated patients



Number at risk	0	5	10	15	20
Non-CT, Right	3931	3110	2344	1037	125
Non-CT, Left	4052	3173	2388	1045	147
CT, Right	8855	4774	1212	0	0
CT, Left	7218	5047	1305	0	0

Non-irradiated patients



Number at risk	0	5	10	15	20
Non-CT, Right	1788	1378	1027	514	85
Non-CT, Left	1910	1439	1087	531	101
CT, Right	1917	1162	315	0	0
CT, Left	1991	1192	300	0	0

Conclusion

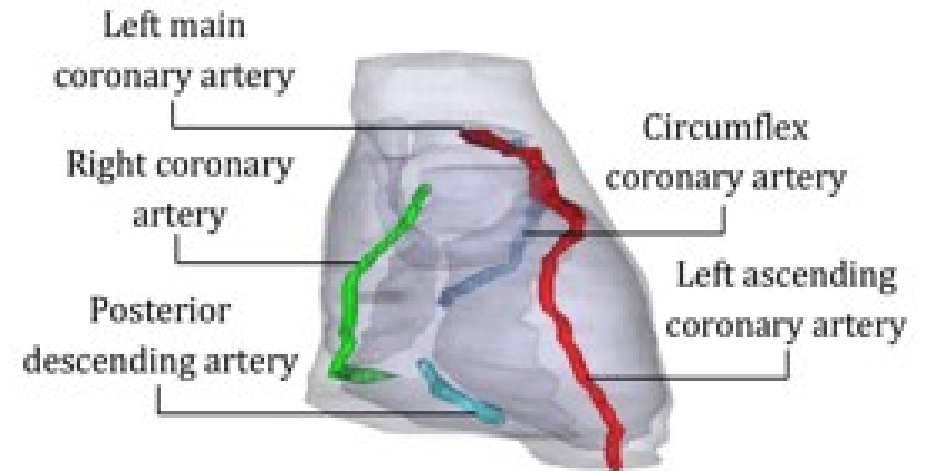
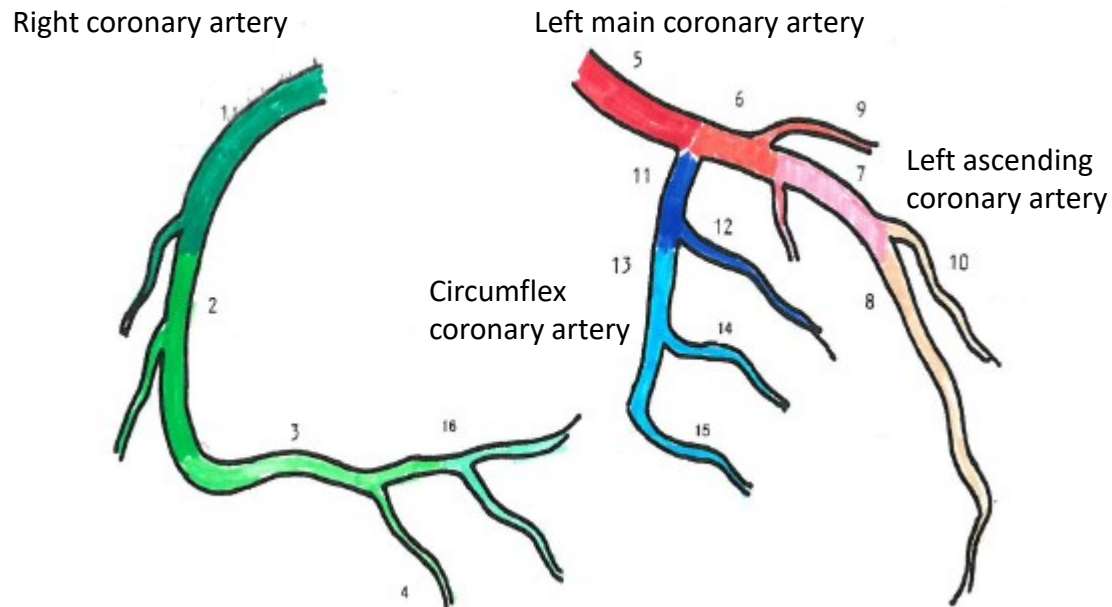
For early BC patients irradiated during a non-CT-based period the risk of cardiac event was higher for left vs right-sided patients

A trend towards an increased risk was seen already within the first 5 years after RT and was significant after 10 years

For patients irradiated during the CT-based period the risk of cardiac event was not influenced by laterality at any time

Perspectives

Analyses of RT doses to the heart and cardiac substructures are needed to enable investigation of RT dose in the area of the cardiac event for both left and right-sided patients

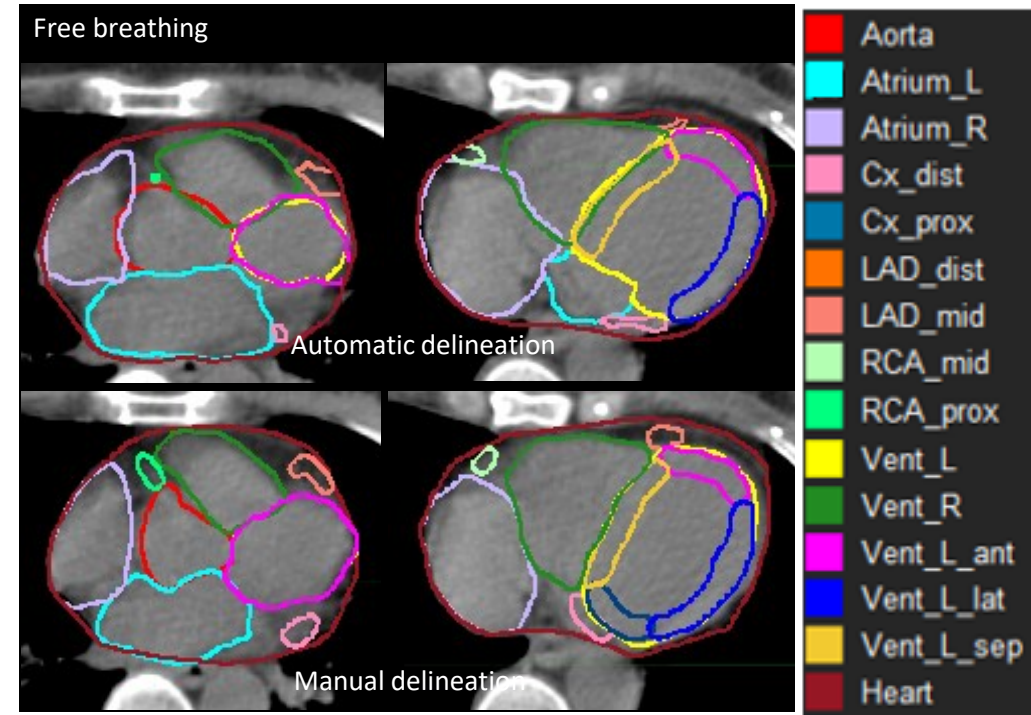


Milo et al, Radiother Oncol 2020

Case-control study

Aim:

- To report individual RT doses to the heart and cardiac substructures in patients treated with CT-based RT
- To investigate if a dose-response relationship was presented
- Abstract submitted to ESTRO 2021



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