

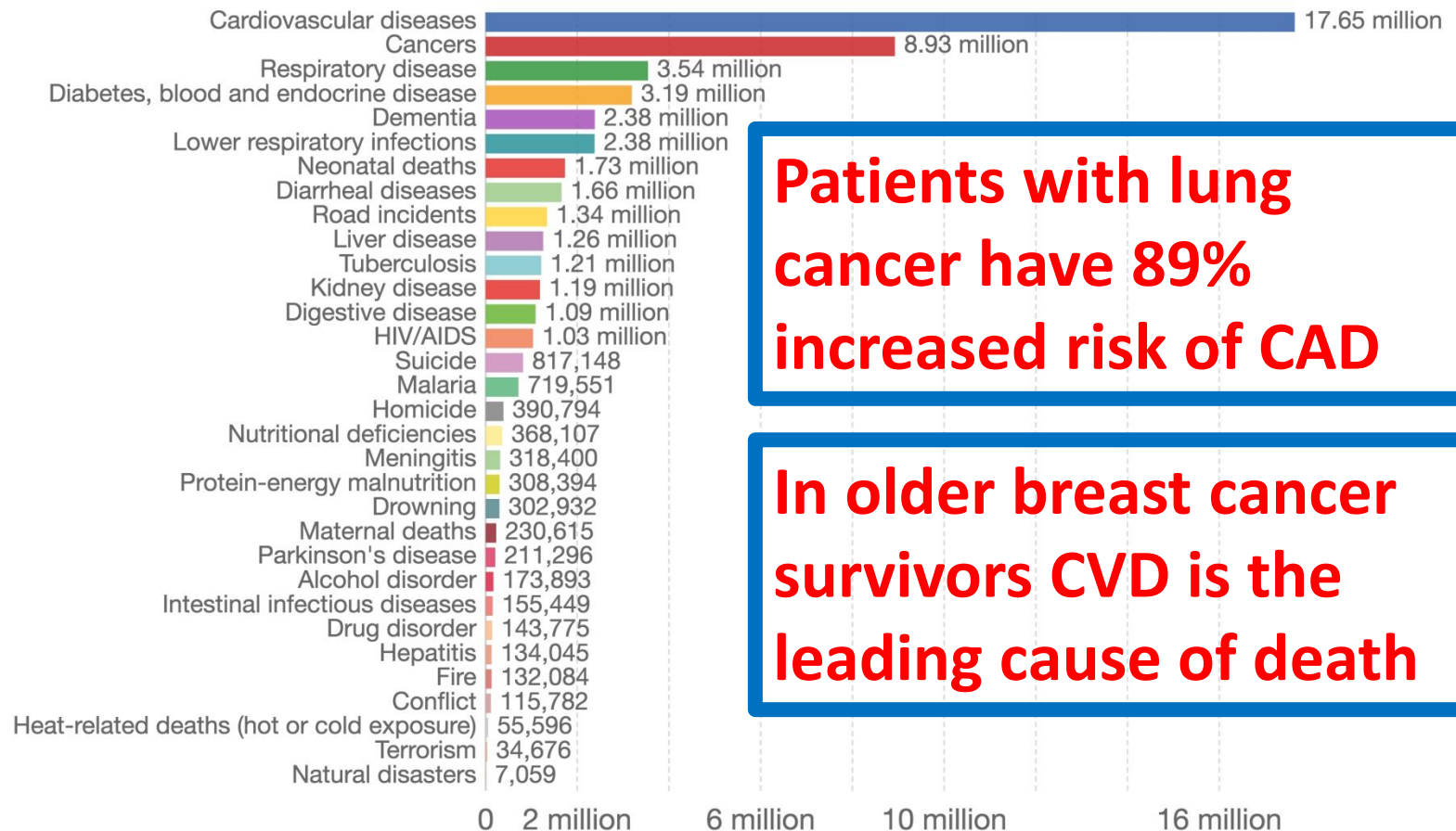
Unidades mixtas de cardio-oncología: el paciente como máximo beneficiado





Annual number of deaths by cause, World, 2016

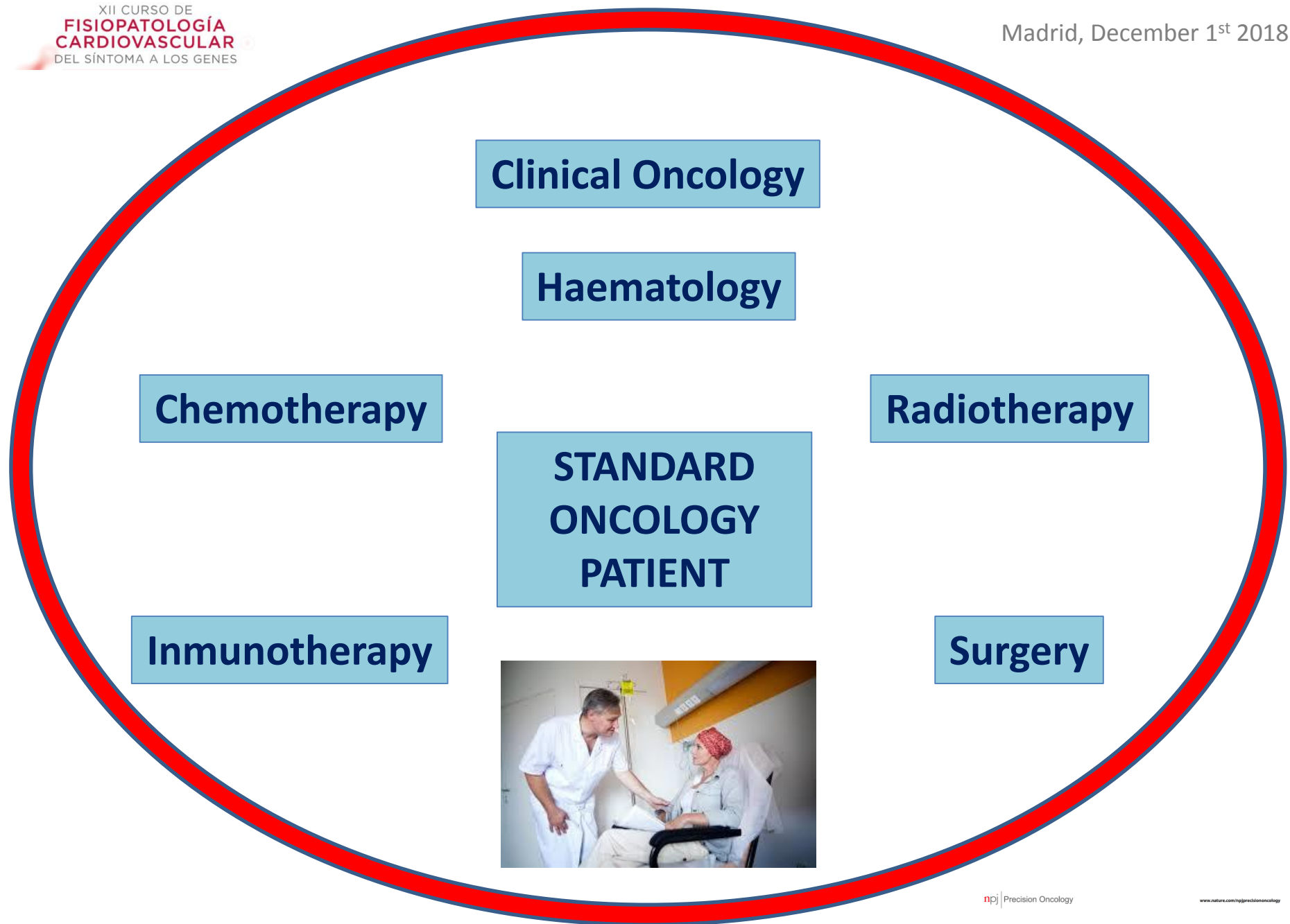
Data refers to the specific cause of death, which is distinguished from risk factors for death, such as air pollution, diet and other lifestyle factors. See sources for further details on definitions of specific cause categories.



Patients with lung cancer have 89% increased risk of CAD

In older breast cancer survivors CVD is the leading cause of death

Source: Institute for Health Metrics and Evaluation (IHME); Global Terrorism Database (GTD); Amnesty International
 OurWorldInData.org/causes-of-death/ • CC BY-SA



Vascular-Coronary

Electrophysiology

Cardiac Imaging

**Cardiac
Rehabilitation**

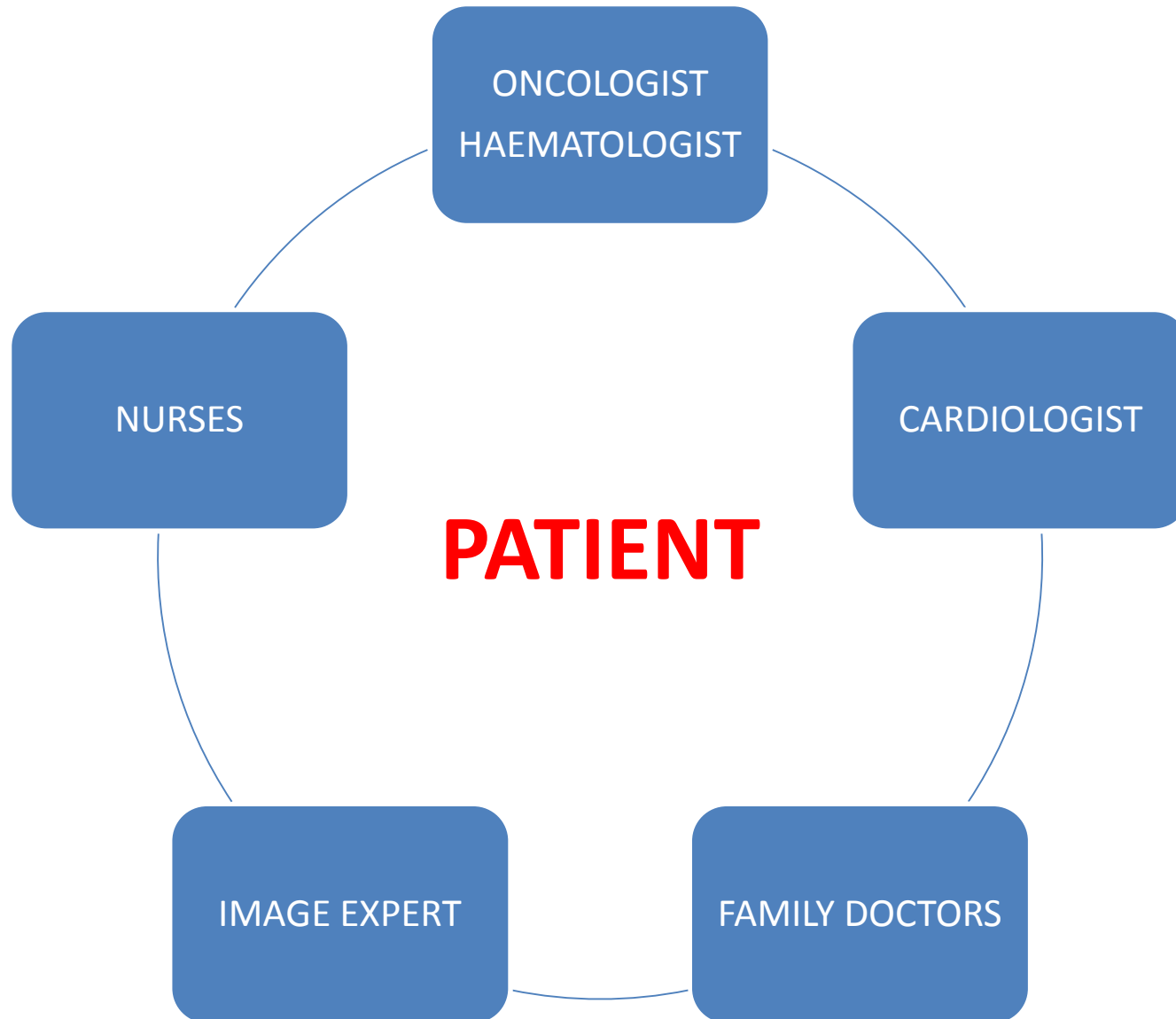
**STANDARD
CARDIOLOGY
PATIENT**

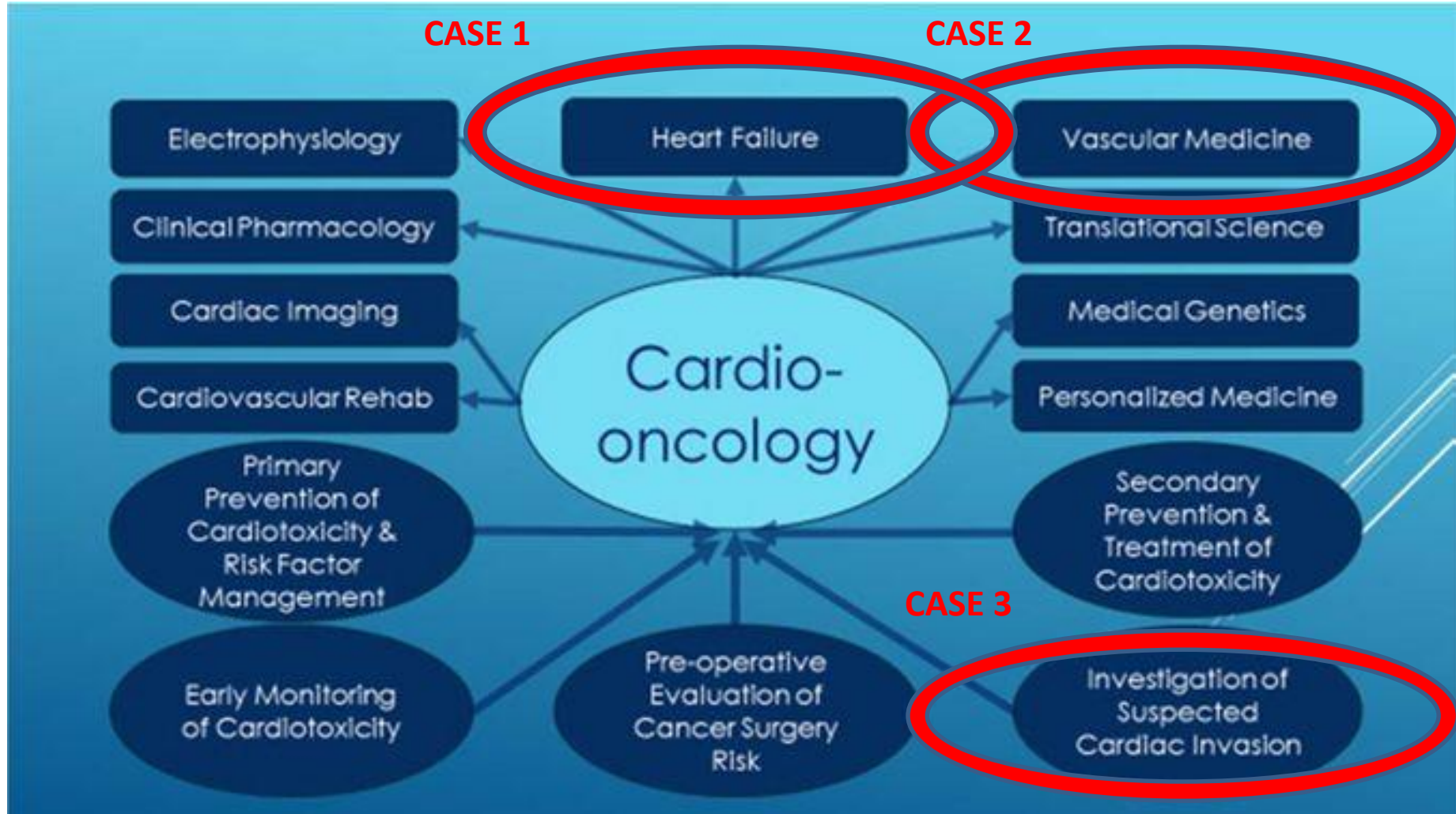
Heart Failure

Genetics









Case 1: María Pilar

68 years old female.

2008: Left breast cancer:
Surgery+radiotherapy+5y tamoxifen.

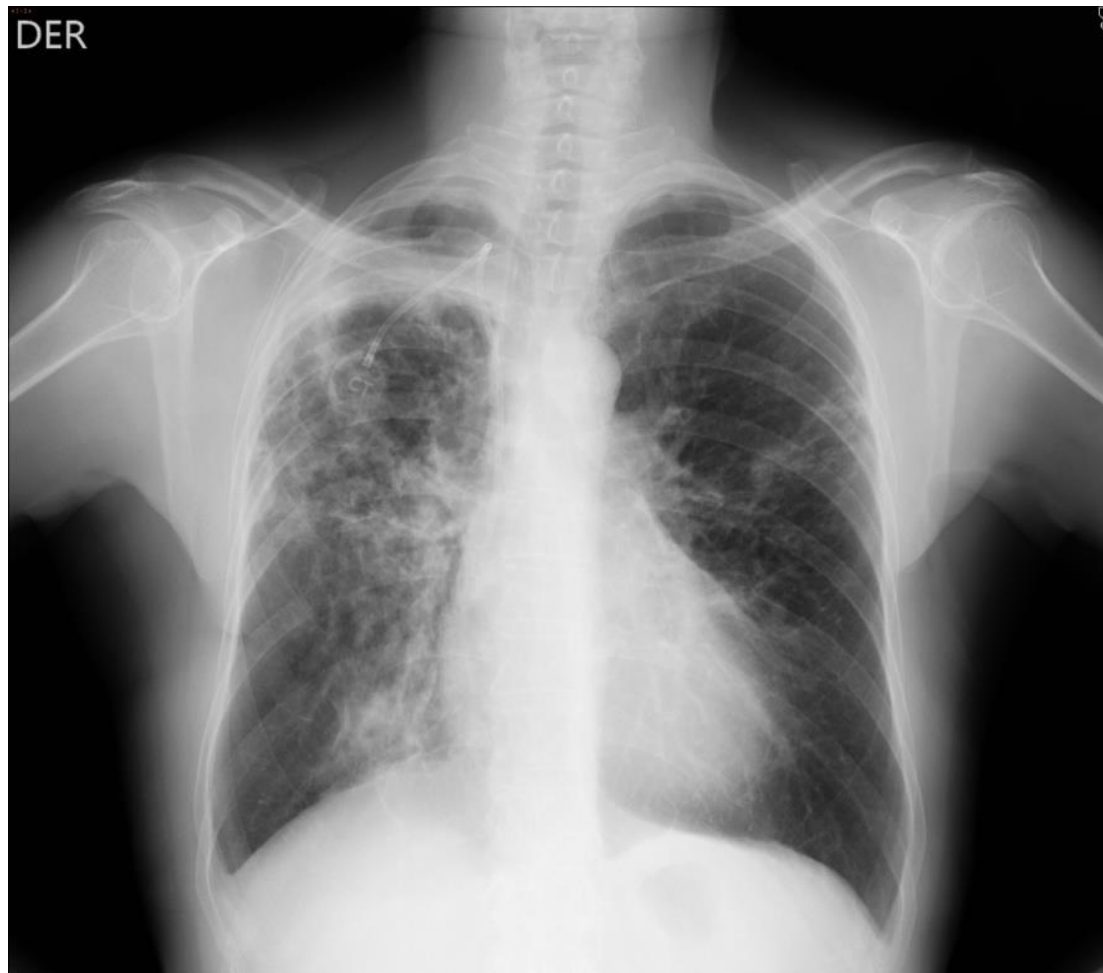
2016: Bilateral breast cancer:
QT: doxorubicina-ciclofosfamida---taxol-
trastuzumab. Letrozol
Surgery: Bilateral mastectomy+right axilar
linfadenectomy
RT: 50Gy right thorax and right axila

Sept 2017: ends trastuzumab



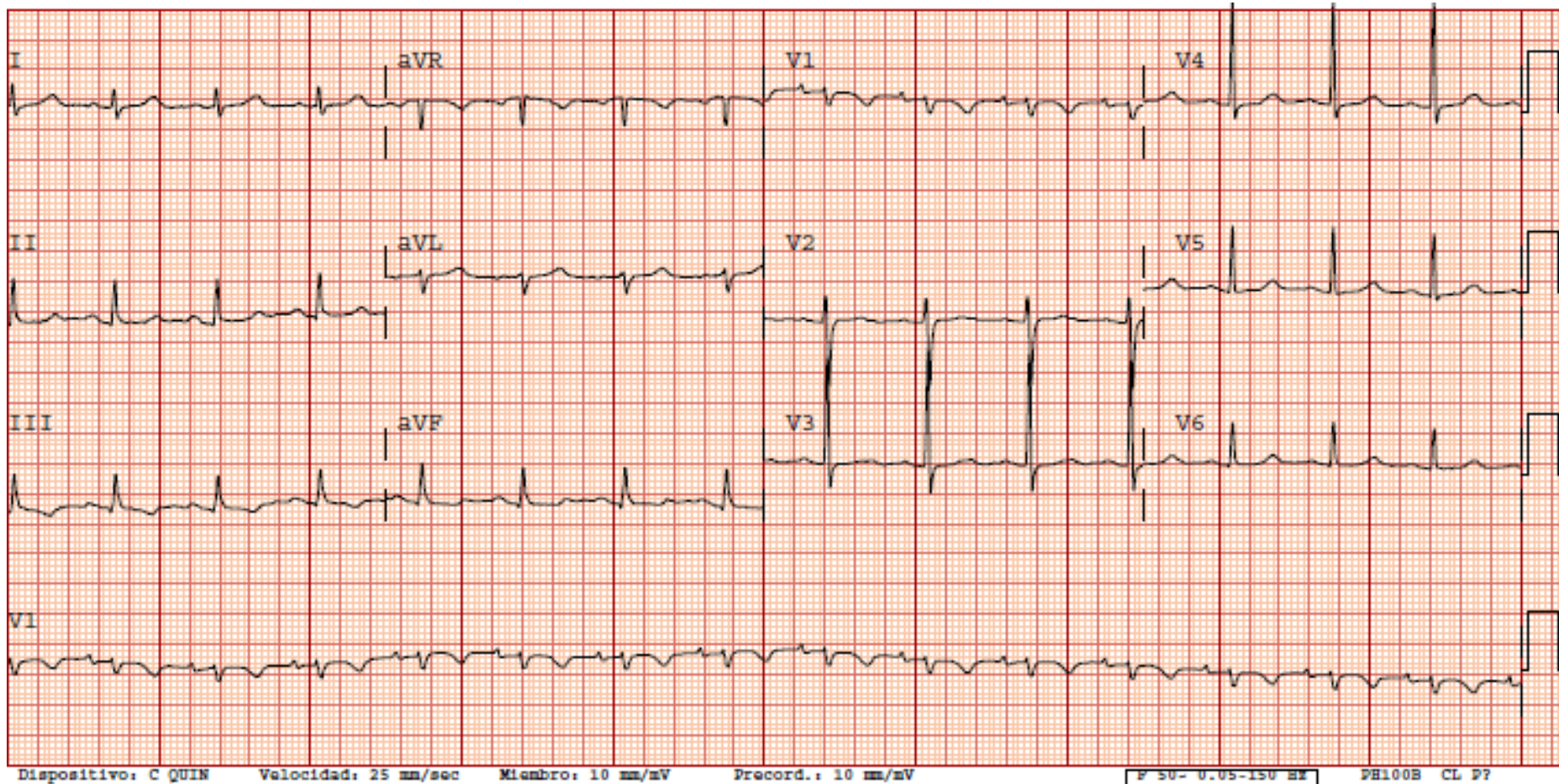
Case 1: María Pilar

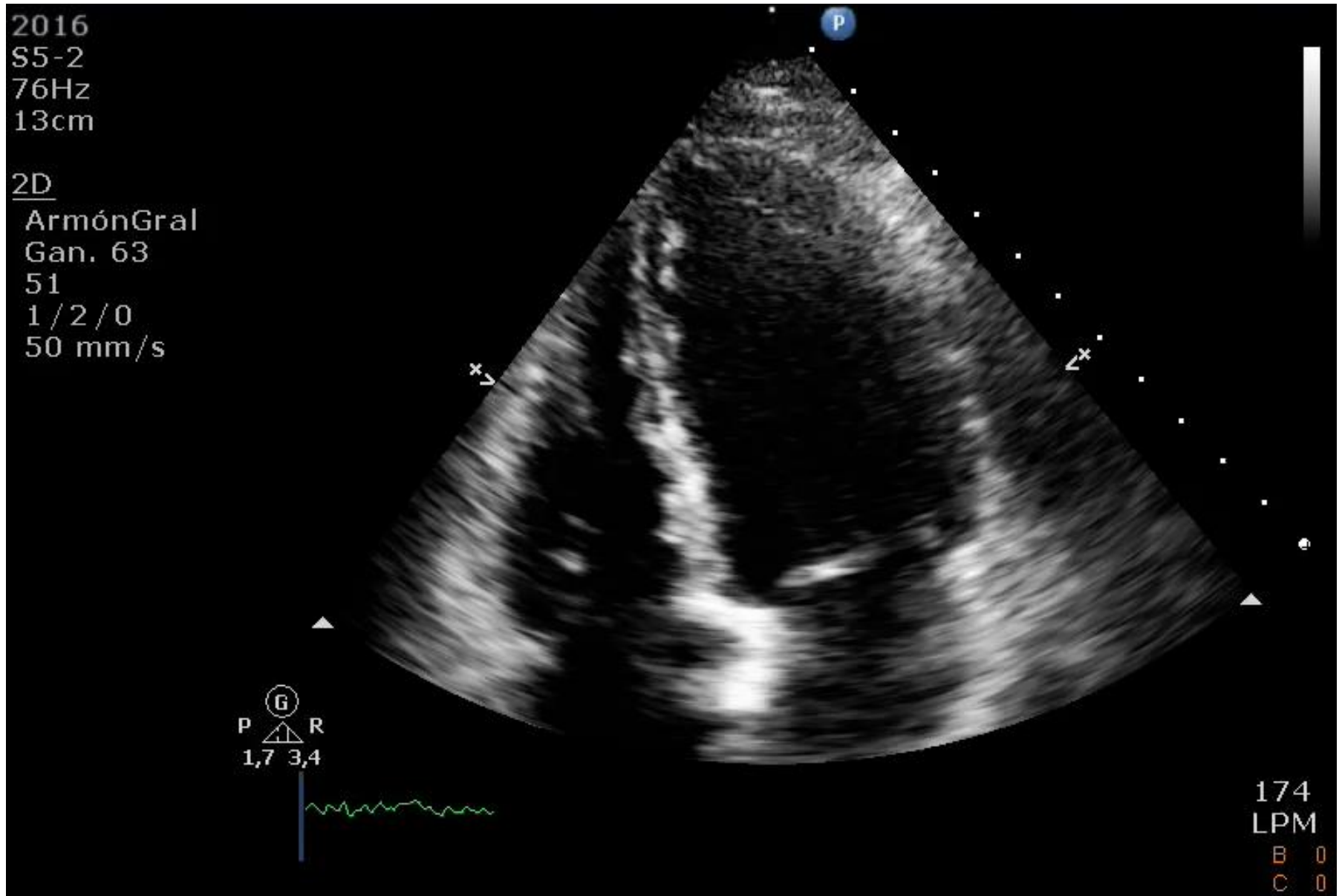
Effort dyspnea since May 2017:

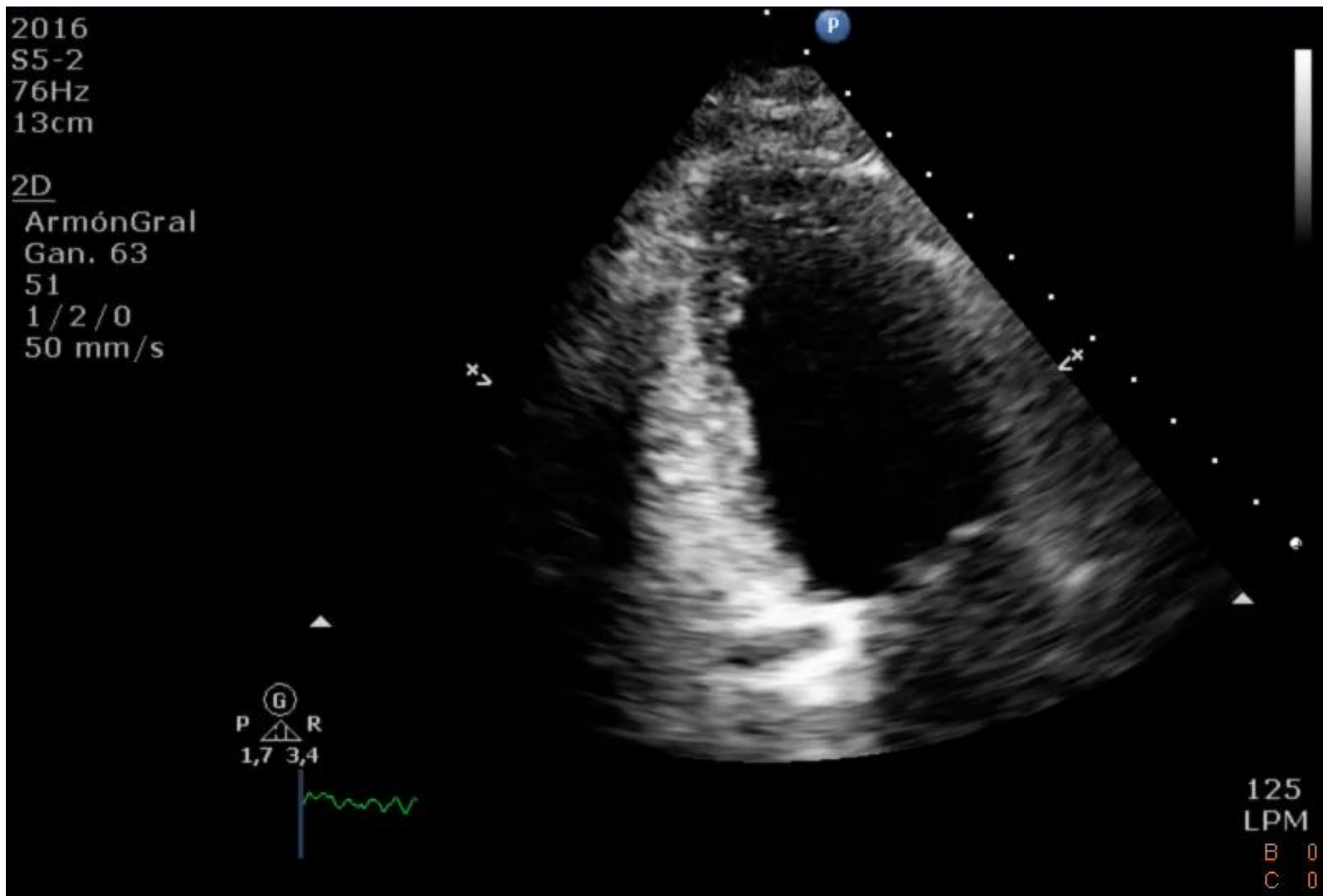


Mild anaemia and Radiotherapy pneumonitis

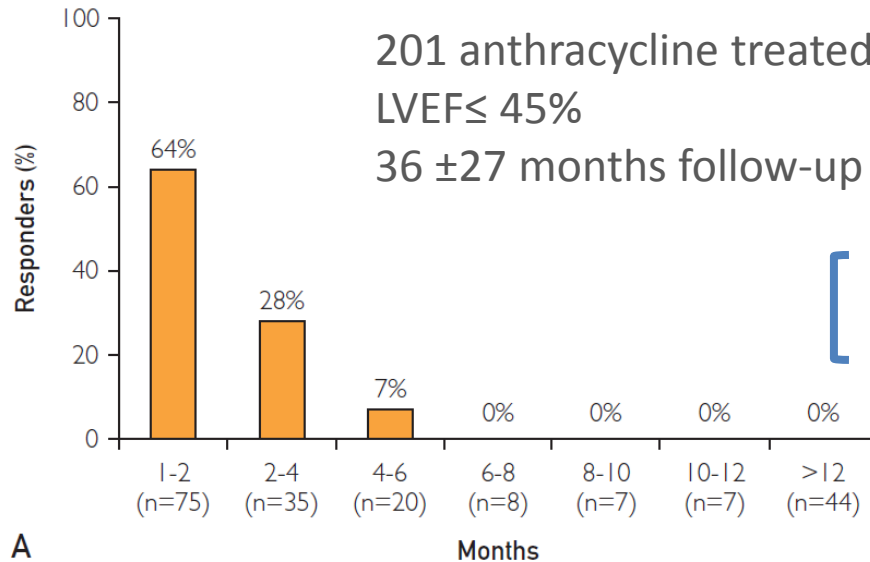
Case 1: María Pilar



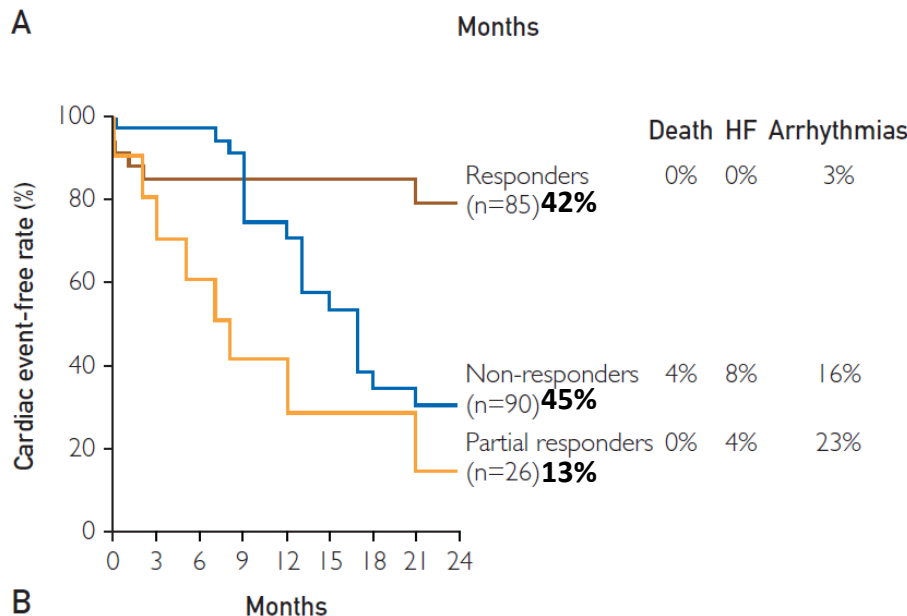




Enalapril and carvedilol



Enalapril (11±7 mg/d) 36%
Enalapril (12±6 mg/d) + **Carvedilol** (14 ±7 mg/d)

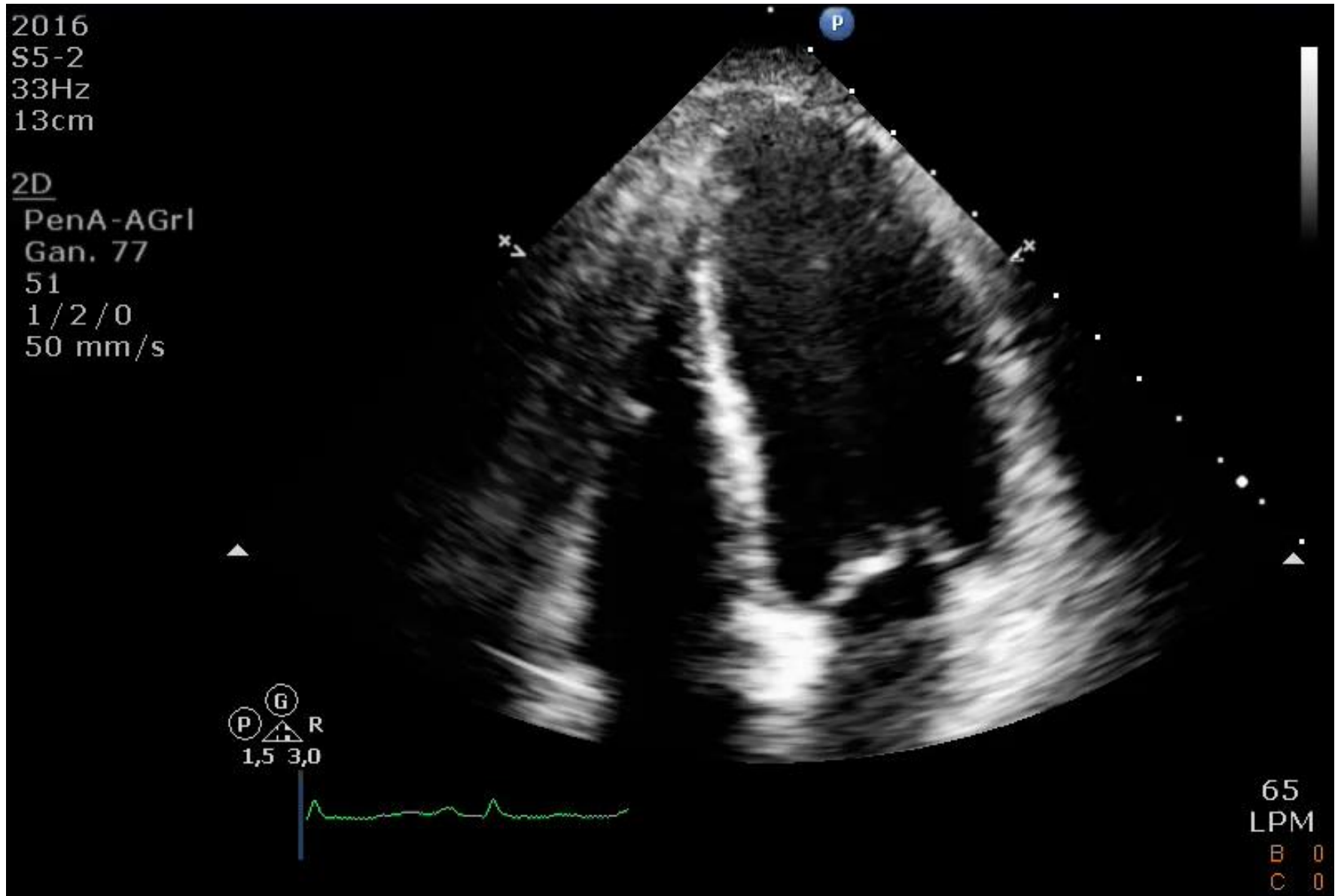


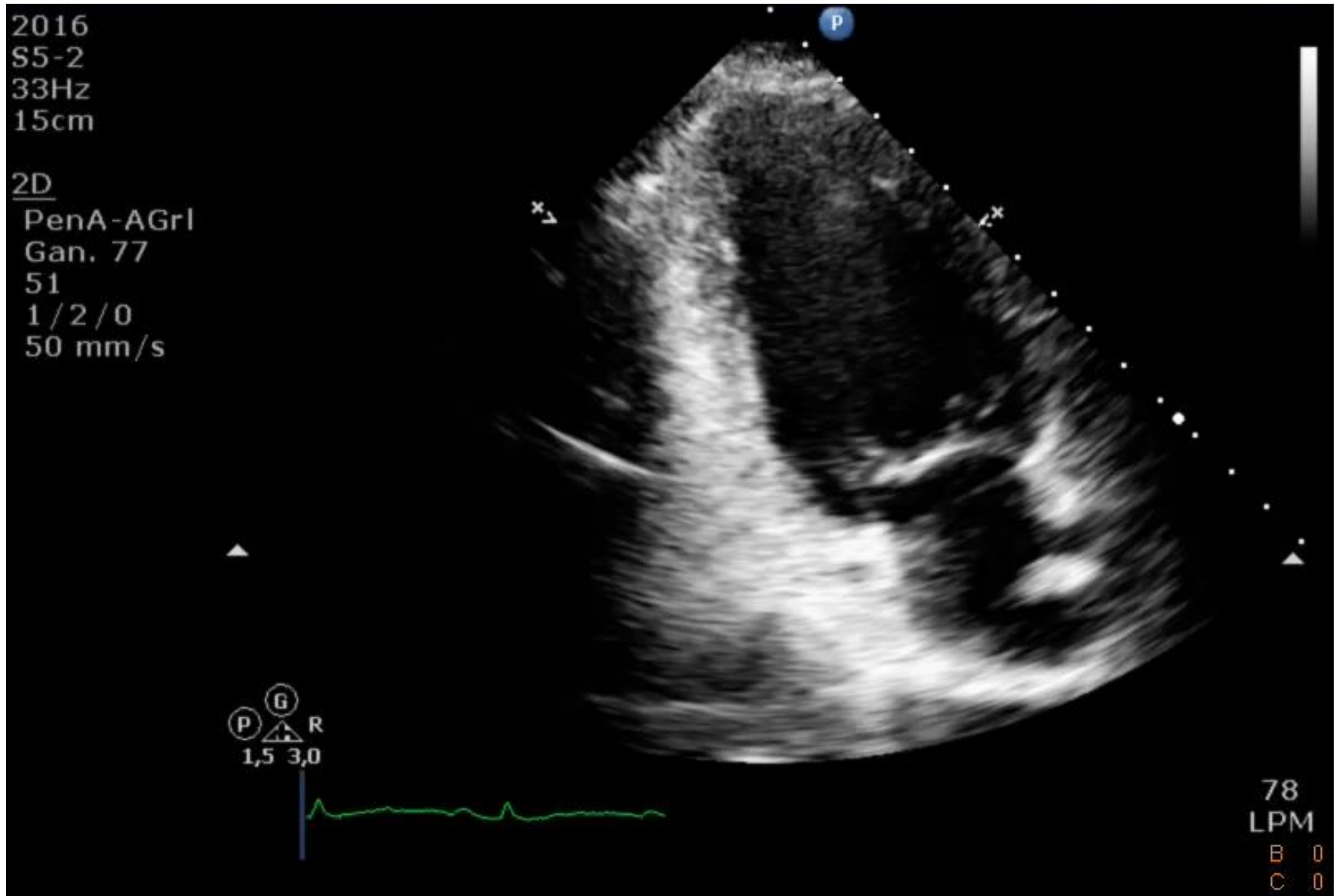
-Responders: LVEF > 50%

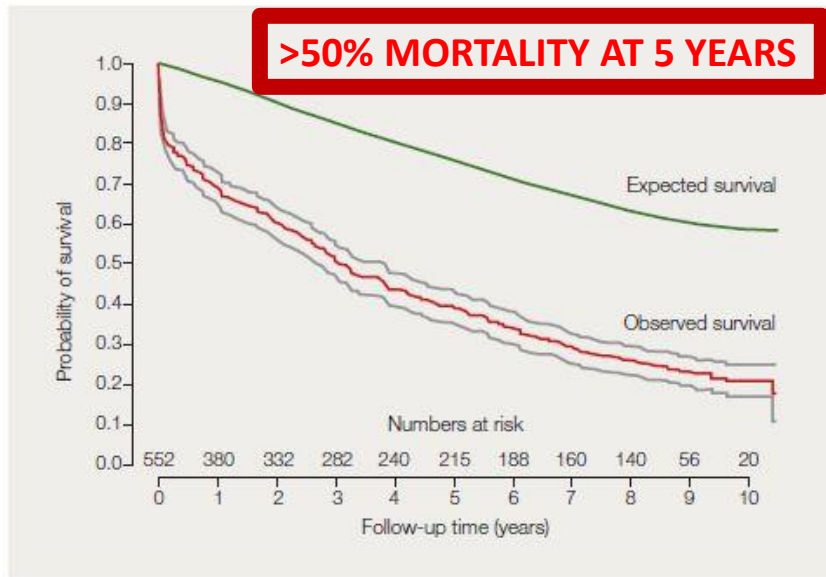
-Partial responders: improvement LVEF ≥ 10%, but LVEF < 50%

-Non-responders

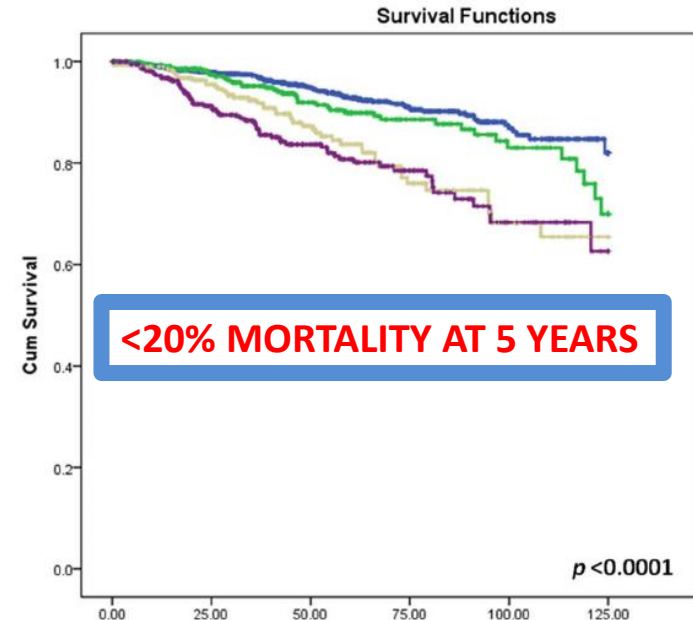
-EARLY DETECTION
-EARLY TREATMENT







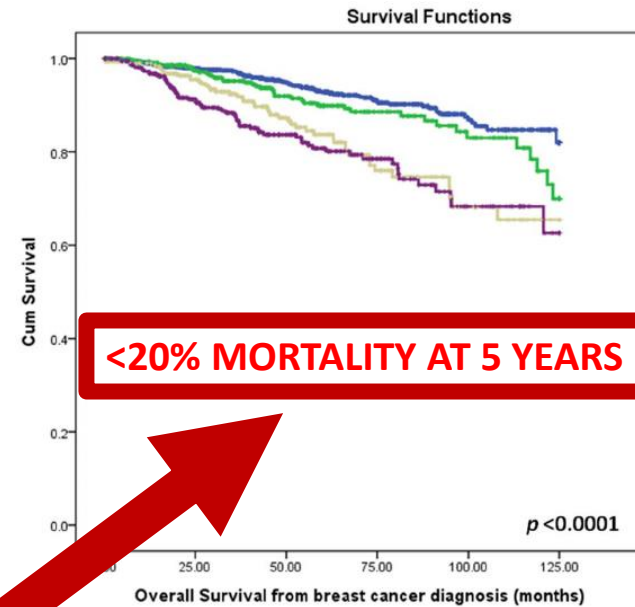
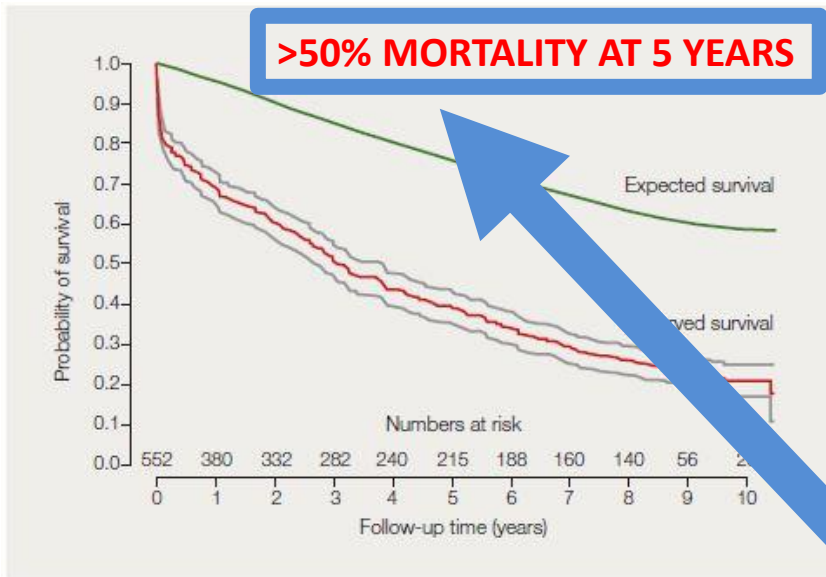
INCIDENT DIAGNOSIS OF **BREAST CANCER**



INCIDENT DIAGNOSIS OF **HEART FAILURE**



DIFFERENT ENTITIES, DIFFERENT PROGNOSIS



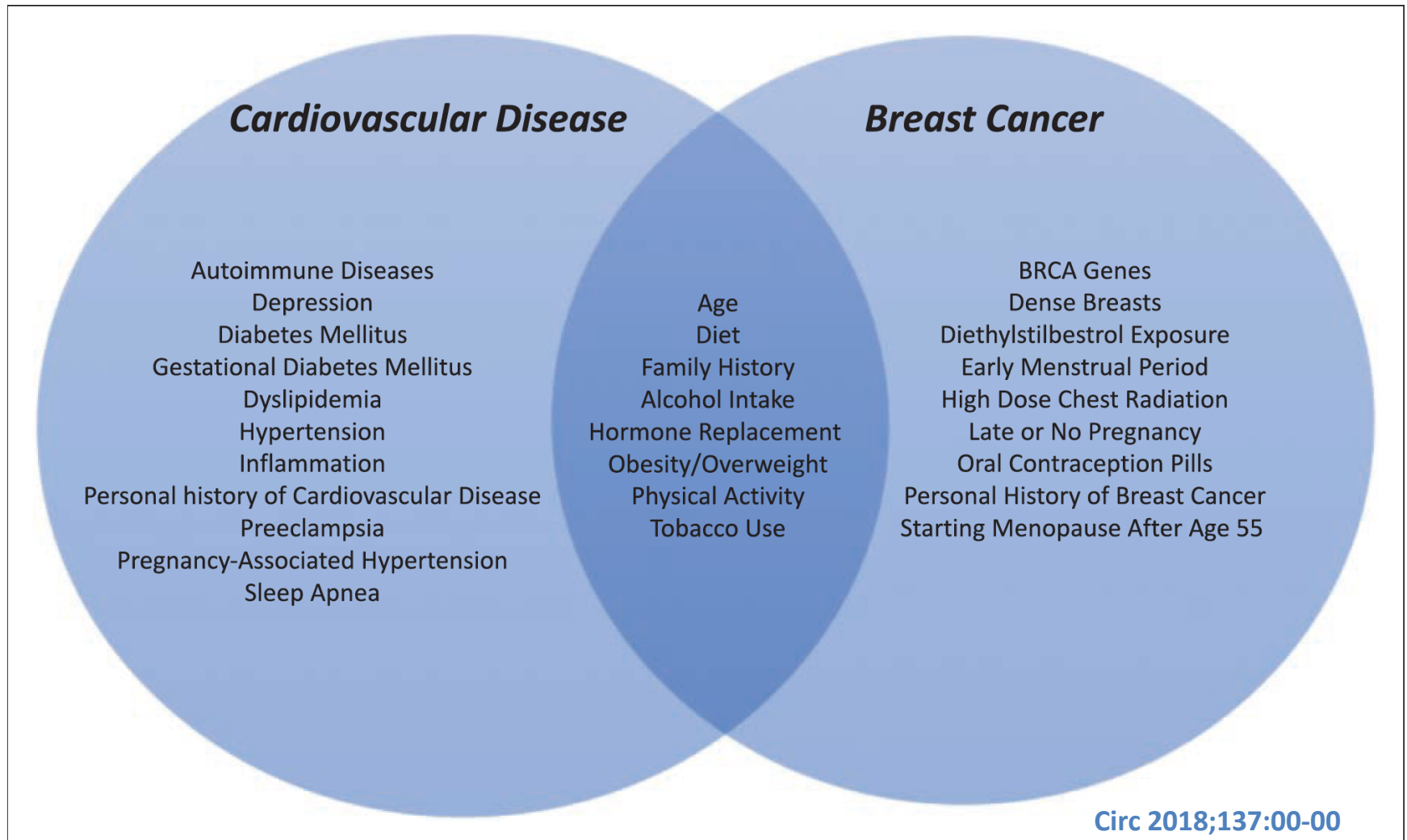
INCIDENT DIAGNOSIS OF **BREAST CANCER**

INCIDENT DIAGNOSIS OF **HEART FAILURE**



THEY ARE THE SAME PATIENTS

Shared risk factors



Incidence of left ventricular dysfunction associated with chemotherapy drugs

Chemotherapy agents	Incidence (%)
Anthracyclines (dose dependent)	
Doxorubicin (Adriamycin) 400 mg/m ²	3–5
550 mg/m ²	7–26
700 mg/m ²	18–48
Idarubicin (>90 mg/m ²)	5–18
Epirubicin (>900 mg/m ²)	0.9–11.4
Mitoxantrone >120 mg/m ²	2.6
Liposomal anthracyclines (>900 mg/m ²)	2
Alkylating agents	
Cyclophosphamide	7–28
Ifosfamide <10 g/m ²	0.5
12.5–16 g/m ²	17
Antimetabolites	
Clofarabine	27
Antimicrotubule agents	
Docetaxel	2.3–13
Paclitaxel	<1

Chemotherapy agents	Incidence (%)
Monoclonal antibodies	
Trastuzumab	1.7–20.1 ^{28a}
Bevacizumab	1.6–4 ^{14b}
Pertuzumab	0.7–1.2
Small molecule tyrosine kinase inhibitors	
Sunitinib	2.7–19
Pazopanib	7–11
Sorafenib	4–8
Dasatinib	2–4
Imatinib mesylate	0.2–2.7
Lapatinib	0.2–1.5
Nilotinib	1
Proteasome inhibitors	
Carfilzomib	11–25
Bortezomib	2–5
Miscellaneous	
Everolimus	<1
Temsirolimus	<1

Myocardial dysfunction risk

Factores de riesgo de DV-CTOX	Antraciclinas	Anti-HER2	Anti-VEGF	Radioterapia torácica
Factores genéticos	X			
Dosis acumulada	X			≥ 35 Gy o ≥ 2 Gy/día
Mujeres	X			X
< 15 o > 65 años	X	X		X
Hipertensión arterial	X	X	X	
Cardiopatía isquémica	X	X	X	X
FEVI en rango bajo de la normalidad (50–55%) antes del tratamiento ^{11,12}	X	X		
Historia de insuficiencia cardiaca/DV-CTOX	X	X	X	
Tratamiento combinado antitumorales* y radioterapia torácica	X	X	X	X
Insuficiencia renal	X			
Obesidad (IMC > 30) y sedentarismo		X		
Tiempo transcurrido desde el tratamiento				X

anti-HER2: fármacos que bloquean el receptor 2 del factor de crecimiento epidérmico humano; anti-VEGF: fármacos inhibidores del factor de crecimiento del endotelio

Medication related risk

-High risk: Anthracyclines, Cyclophosphamide, Trastuzumab, Carfilzomib

-Intermediate risk: Docetaxel, Pertuzumab, Sunitinib, Sorafinib

-Low risk: Bevacizumab, Dasatinib, Imatinib, Lapatinib

Case 2: Fernando

34 years old

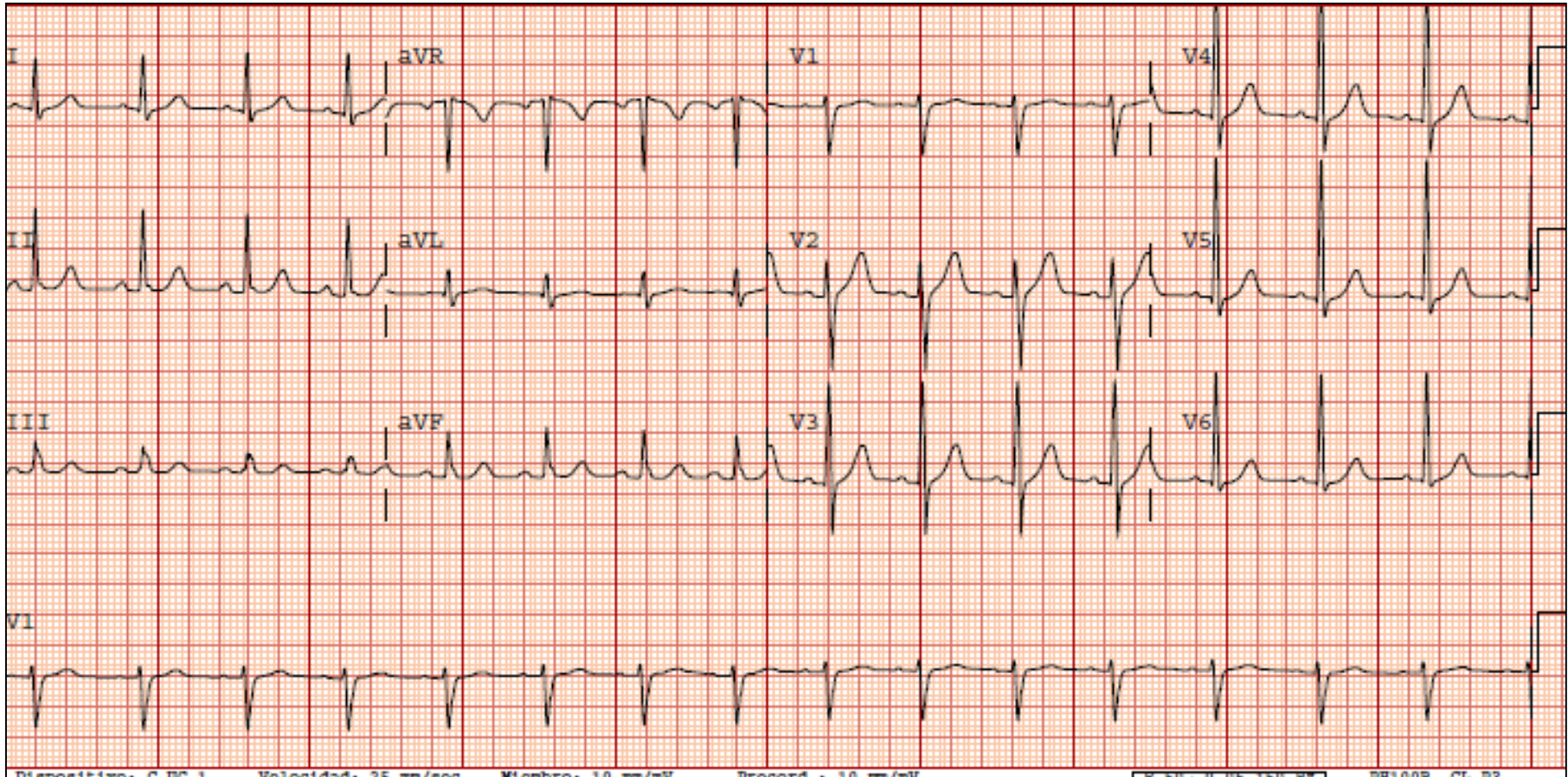
No cardiovascular risk factors

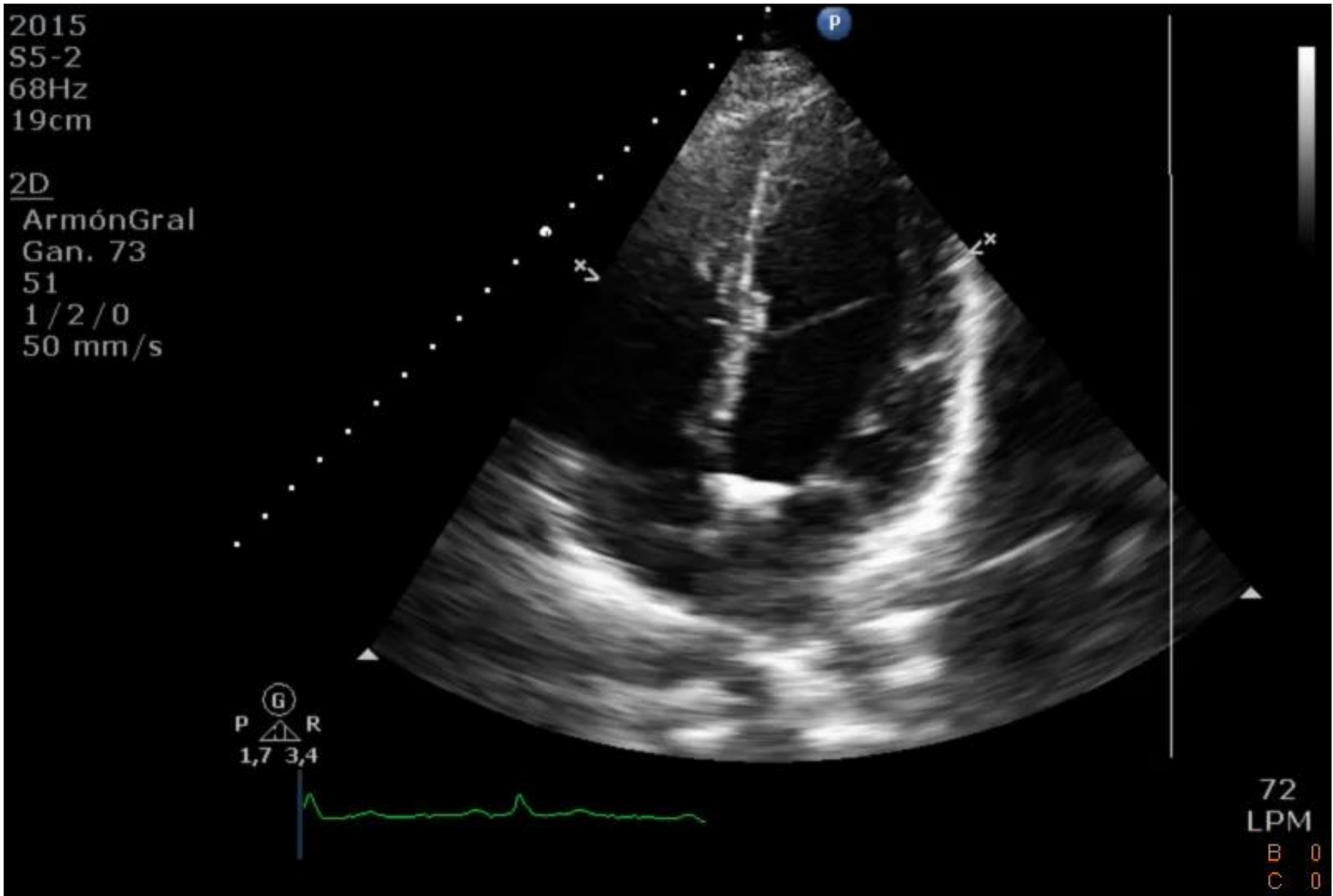
2000: Hodgkin lymphoma treated with QT chest RT.

2018: 3 month effort angina.



Case 2: Fernando

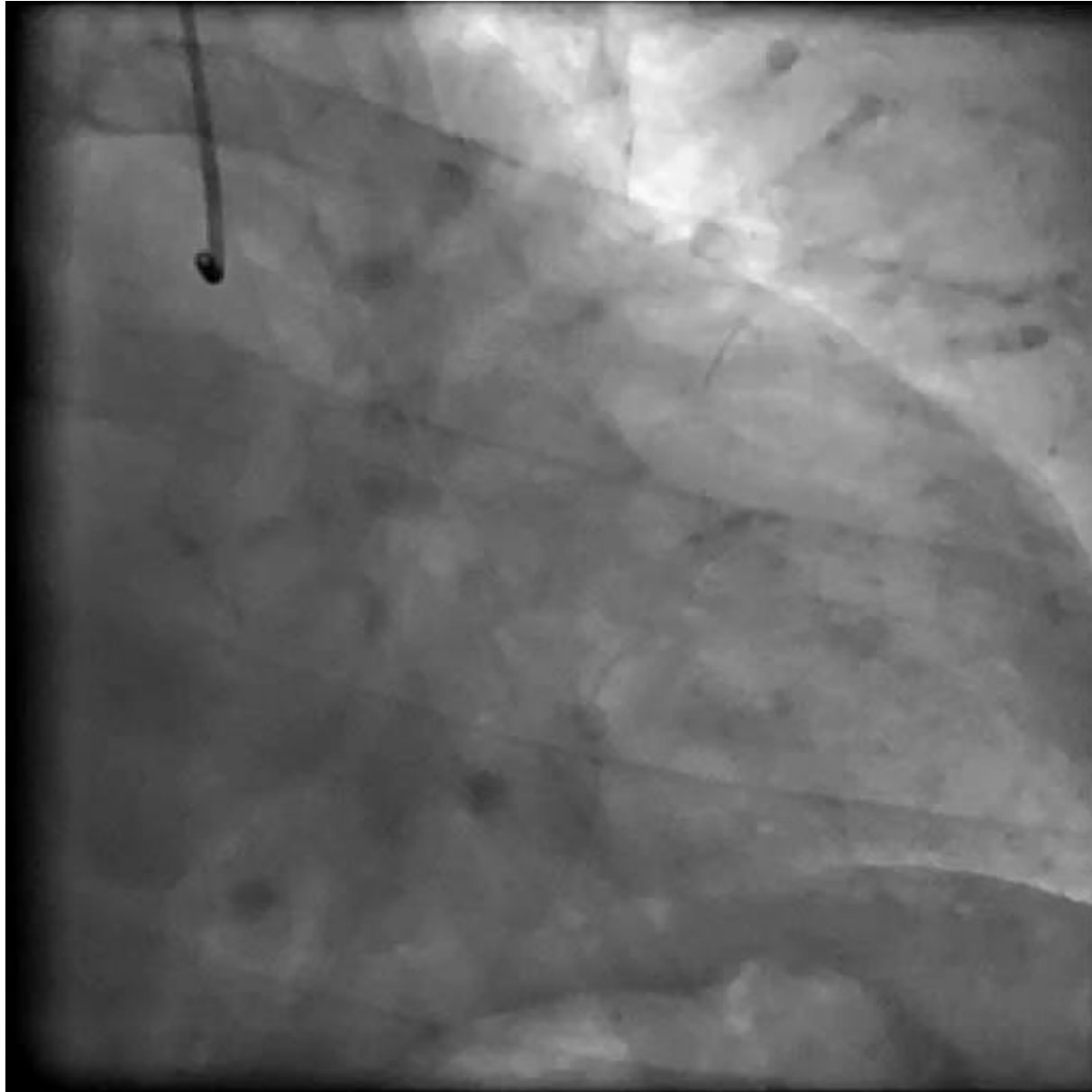




Case 2: Fernando

Treadmill Stress test



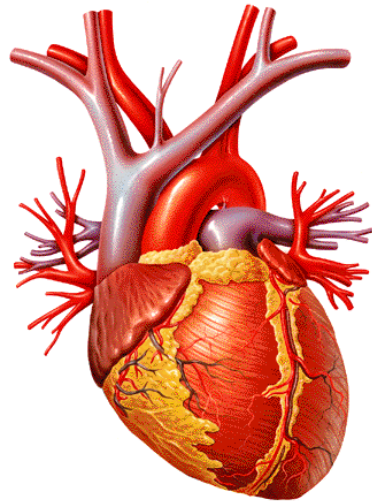


Radiotherapy induced cardiotoxicity

- Cellular damage
- High chest doses, > 30Gy:
Hodgkin lymphoma, breast cancer
- Long term damage

Pericarditis

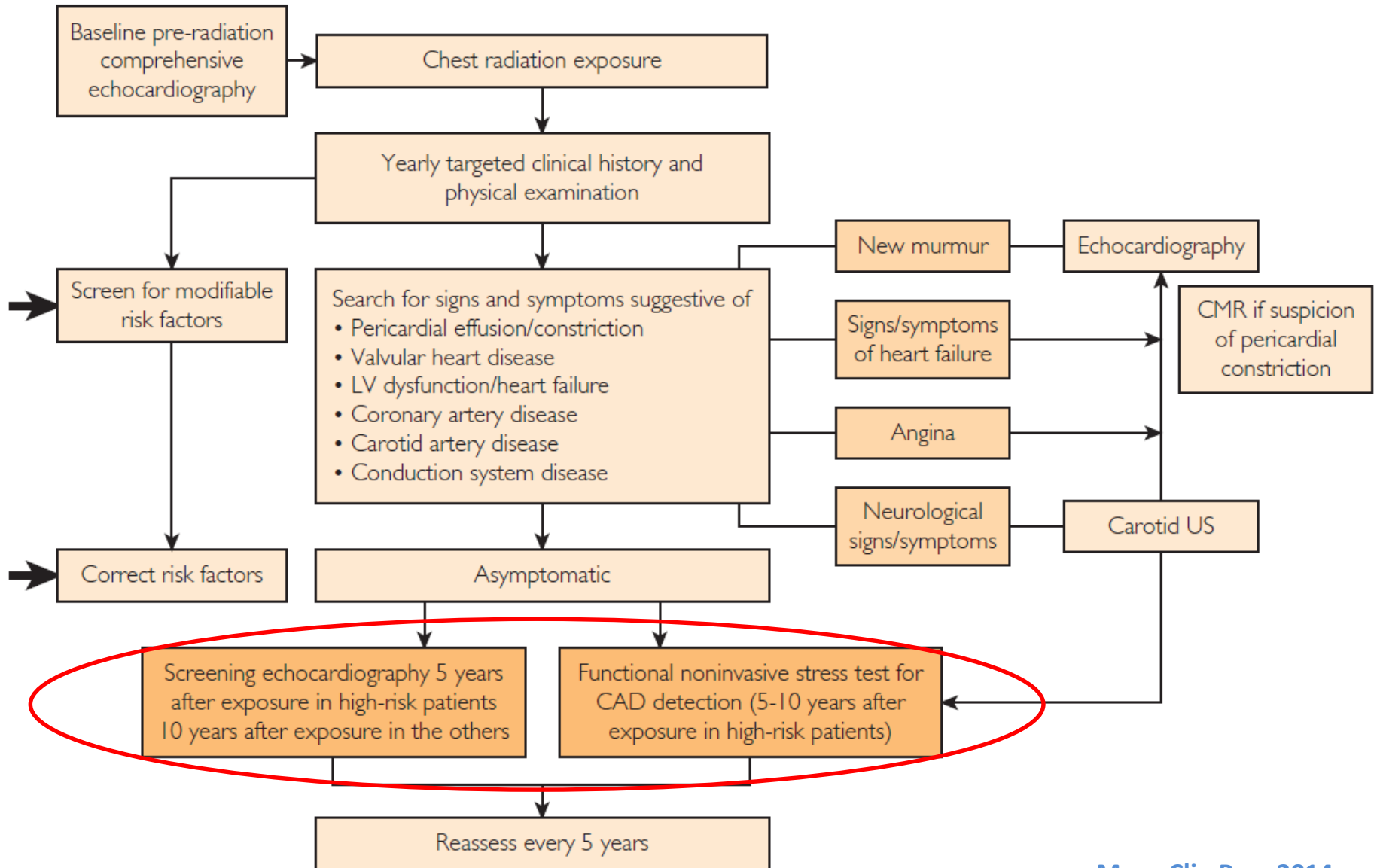
Coronary disease



Valvulopathy

Cardiomyopathy

Conduction system disease



Case 3: José Luis



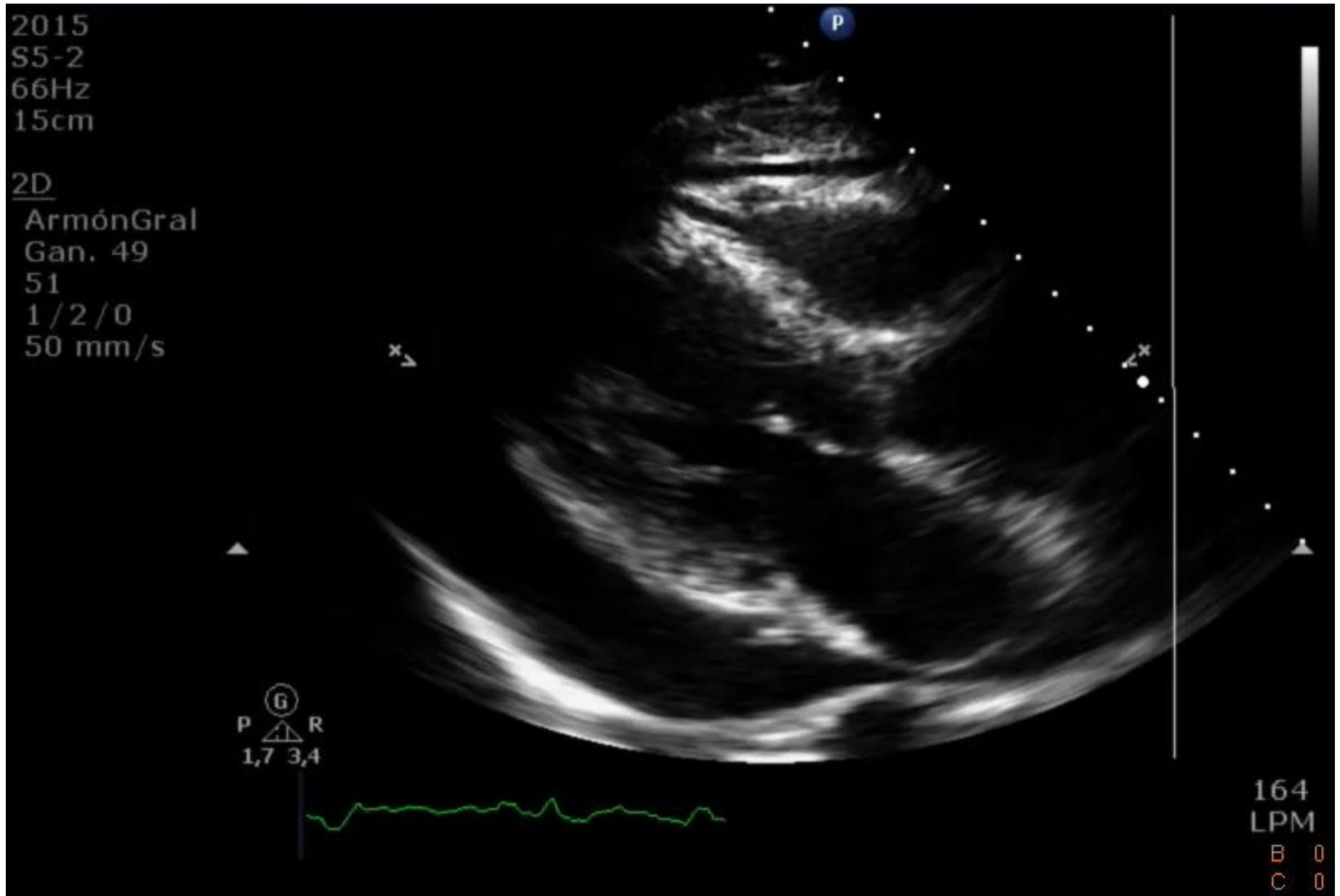
64 years old

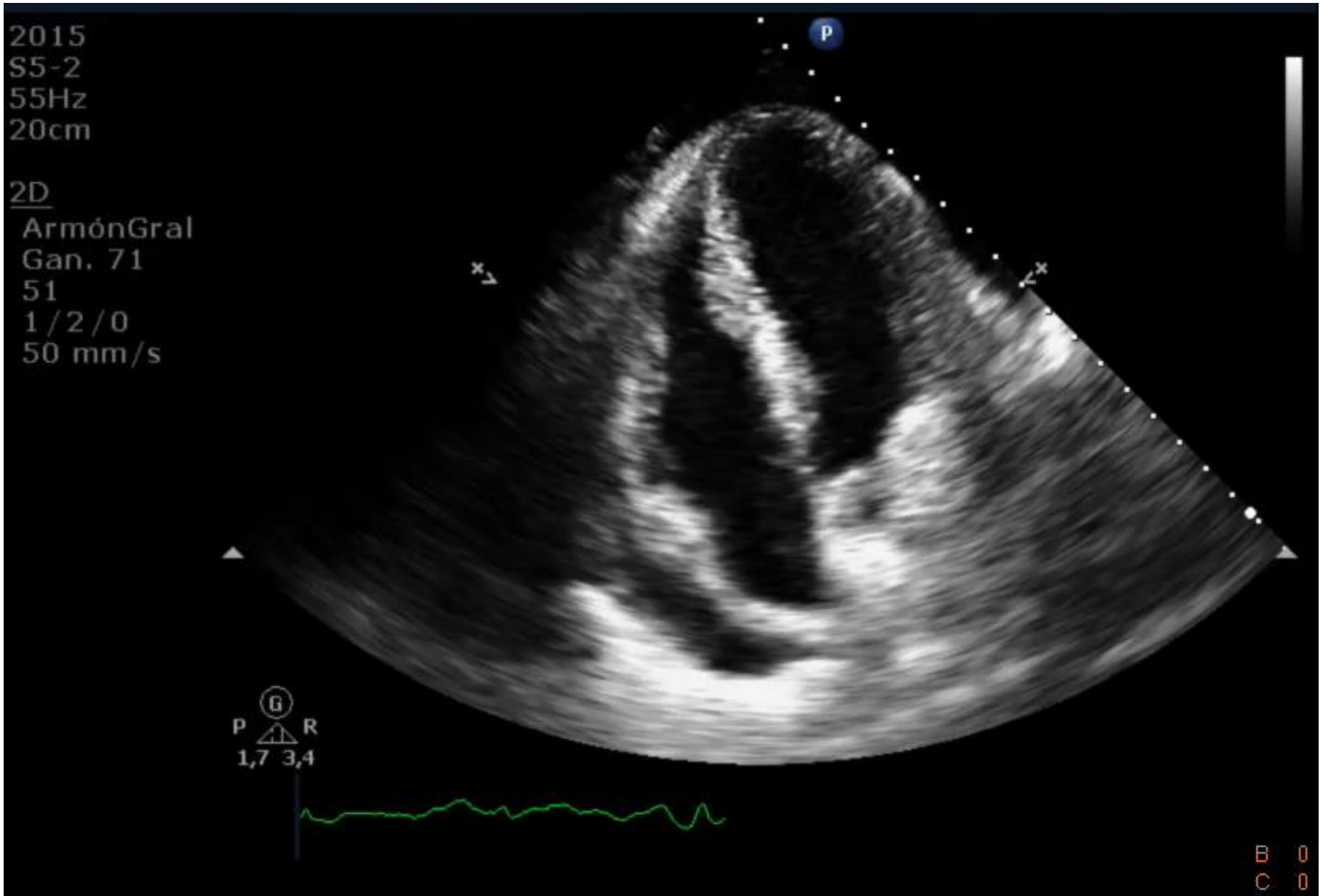
Previous smoker more than 30 years ago, hypertension treated with enalapril 20 mg/d for the last 10 years.

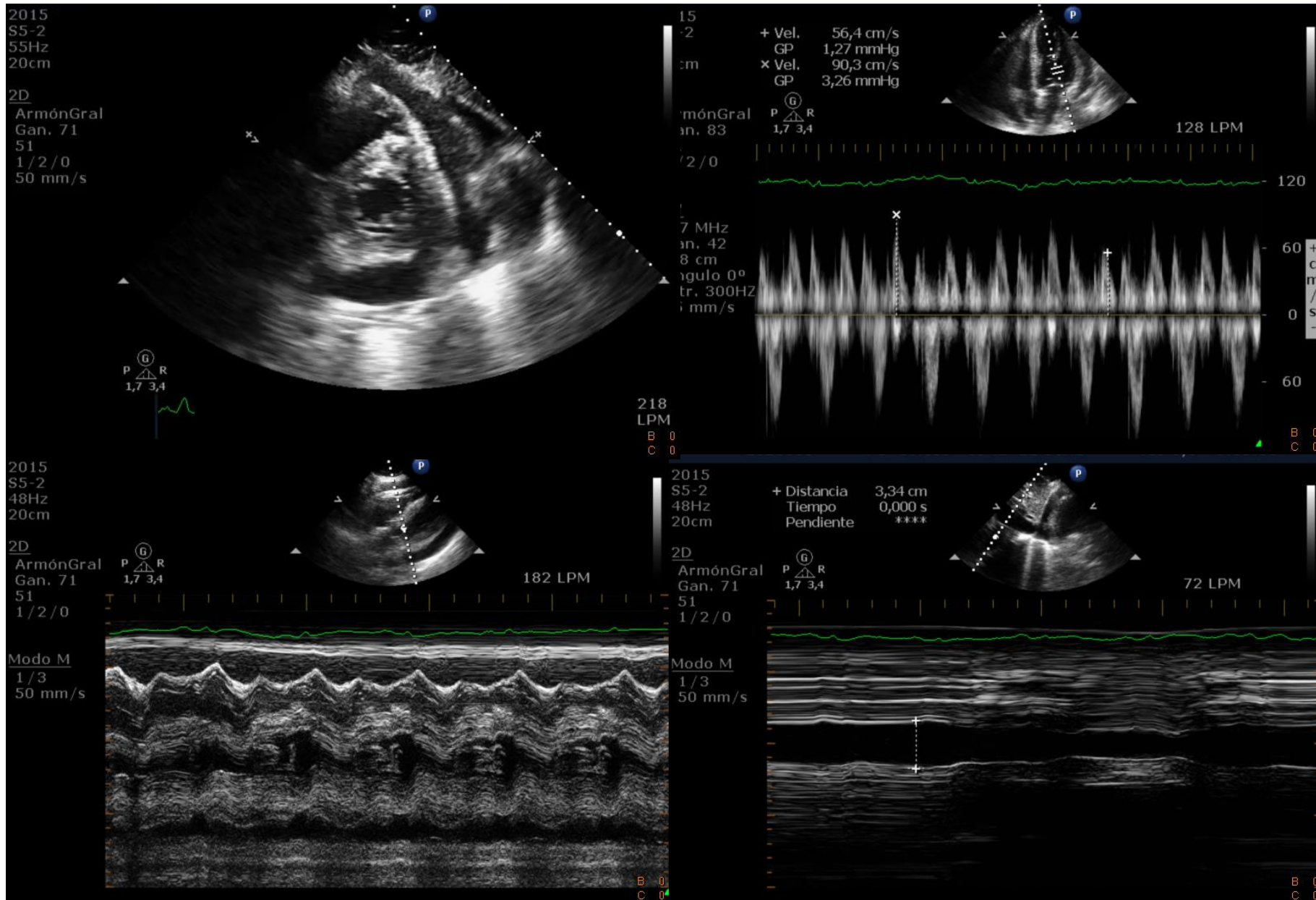
Sept 2018: Three month effort dyspnea: Recent diagnosis of Lung adenocarcinoma stage IV with moderate pericardial effusion and no haemodynamic compromise.

Starts treatment with carboplatin-permetrexed.

October 2018: Left calf muscle pain: left limb deep vein thrombosis. Starts low molecular heparin treatment







Take-home messages

- With many shared modifiable risk factors, cancer and CVD often coexist in the same individuals.
- Chemotherapy, radiotherapy and immunotherapy have potential cardiotoxicity.
- Cardio-Oncologist: Past, Present and Future