



ACHTERGROND EN DAGNOSTIEK

Robert Riezebos
OLVG Amsterdam





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- clinical syndrome

impaired cardiac pump function

- late

- final common



Table 3 Definition of heart failure

Heart failure is a clinical syndrome in which patients have the following features:

- **Symptoms typical of heart failure**

(breathlessness at rest or on exercise, fatigue, tiredness, ankle swelling)

and

- **Signs typical of heart failure**

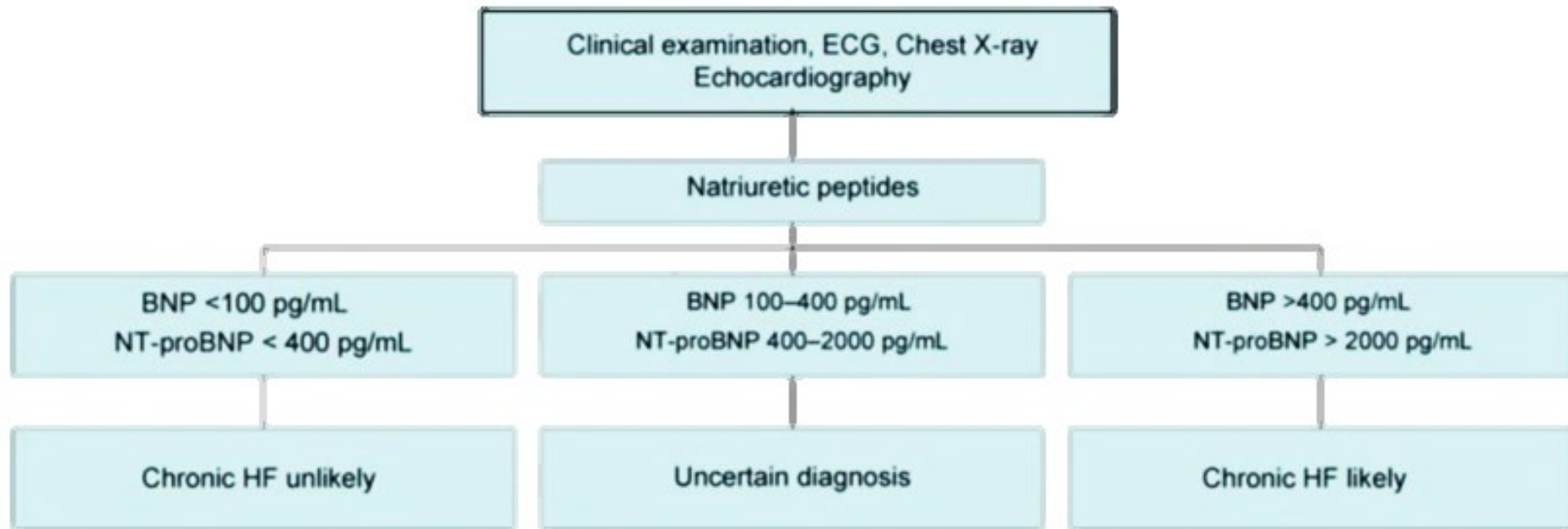
(tachycardia, tachypnoea, pulmonary rales, pleural effusion, raised jugular venous pressure, peripheral oedema, hepatomegaly)

and

- **Objective evidence of a structural or functional abnormality of the heart at rest**

(cardiomegaly, third heart sound, cardiac murmurs, abnormality on the echocardiogram, raised natriuretic peptide concentration)





Confirmation by echocardiography of the diagnosis of heart failure and/or cardiac dysfunction is mandatory and should be performed shortly following suspicion of the diagnosis of HF. Echocardiography is widely available, rapid, non-invasive, and safe, and provides extensive information on cardiac anatomy (volumes, geometry, mass), wall motion, and valvular function. The study provides essential information on the aetiology of HF. In general a diagnosis of heart failure should include an echocardiogram.





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Common

Ischaemic heart disease
Hypertension
Valvular heart disease\ldiopathic
Dilated cardiomyopathy

Less Common

Diabetes
Myocarditis
Congenital heart disease
Drugs (alcohol or chemotherapeutic agents, e.g. anthracyclines)
HIV infection
Peripartum cardiomyopathy
Thyroid disease (hypo- or hyperthyroidism)
Infiltrative conditions (sarcoidosis, amyloidosis)
Connective tissue diseases
Iron overload
Arrhythmia- or tachycardia-induced cardiomyopathy

- descriptive
- diseases of the myocardium
- genetic
- heart failure
- cardiovascular death

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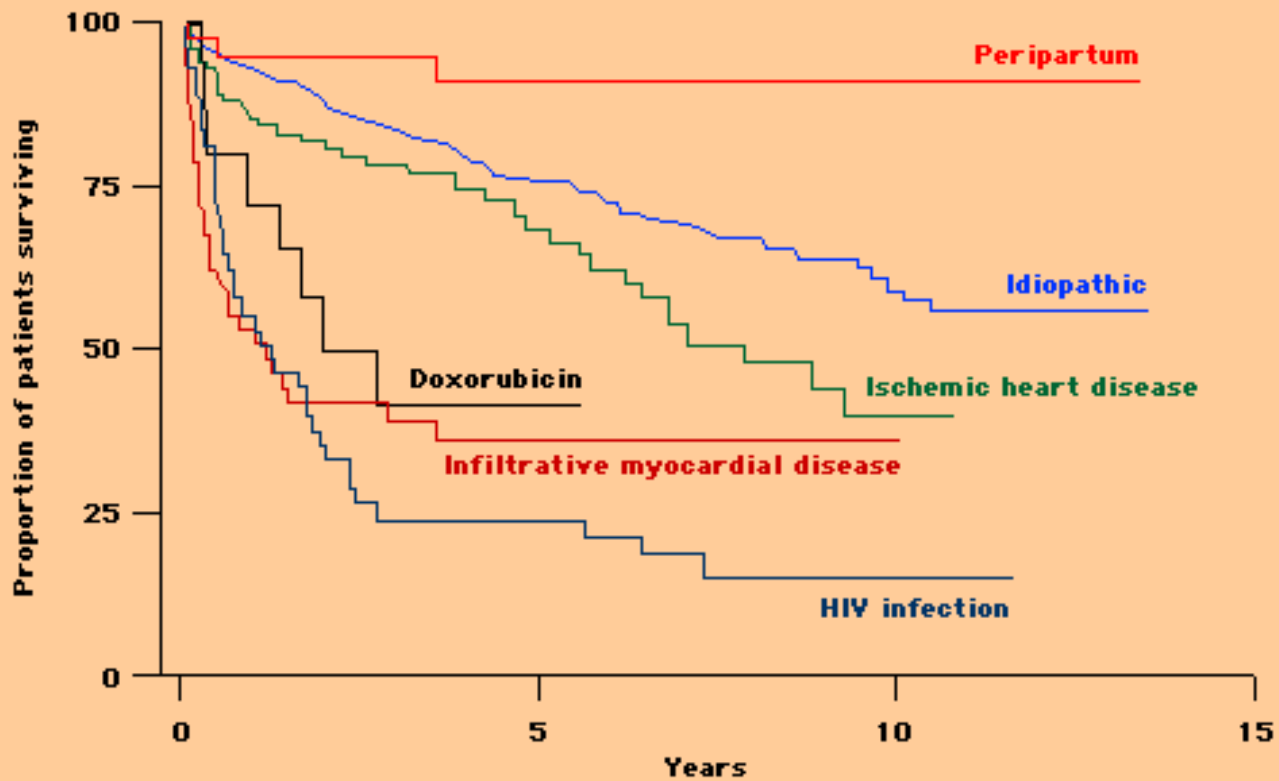
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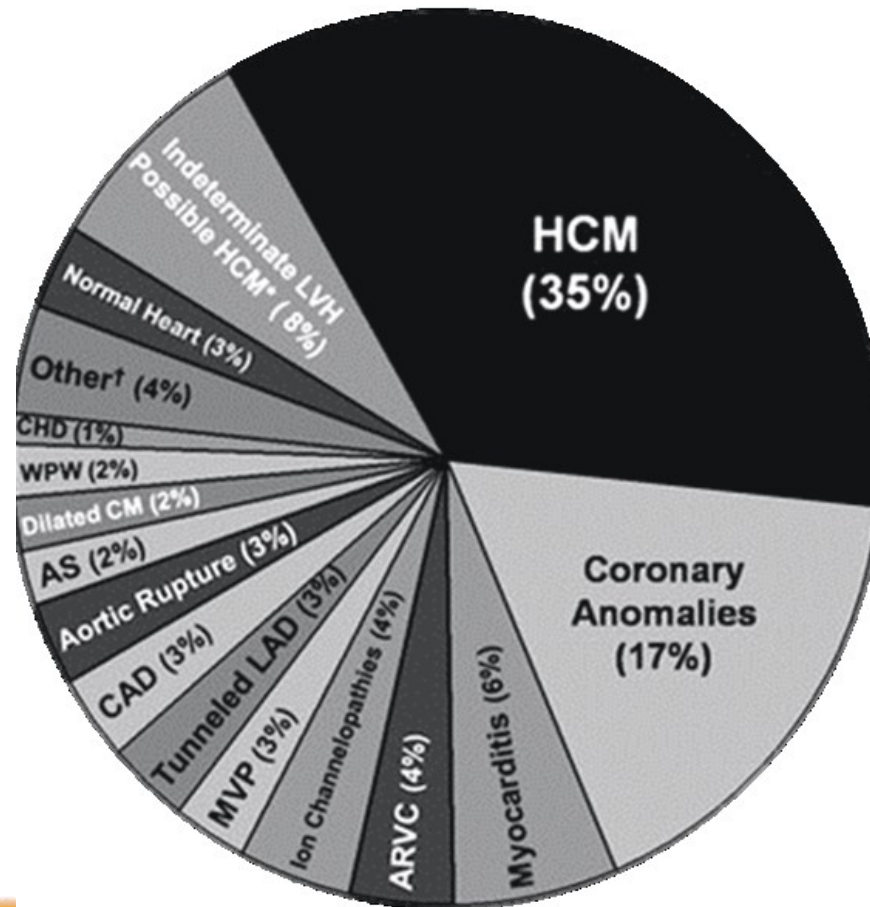
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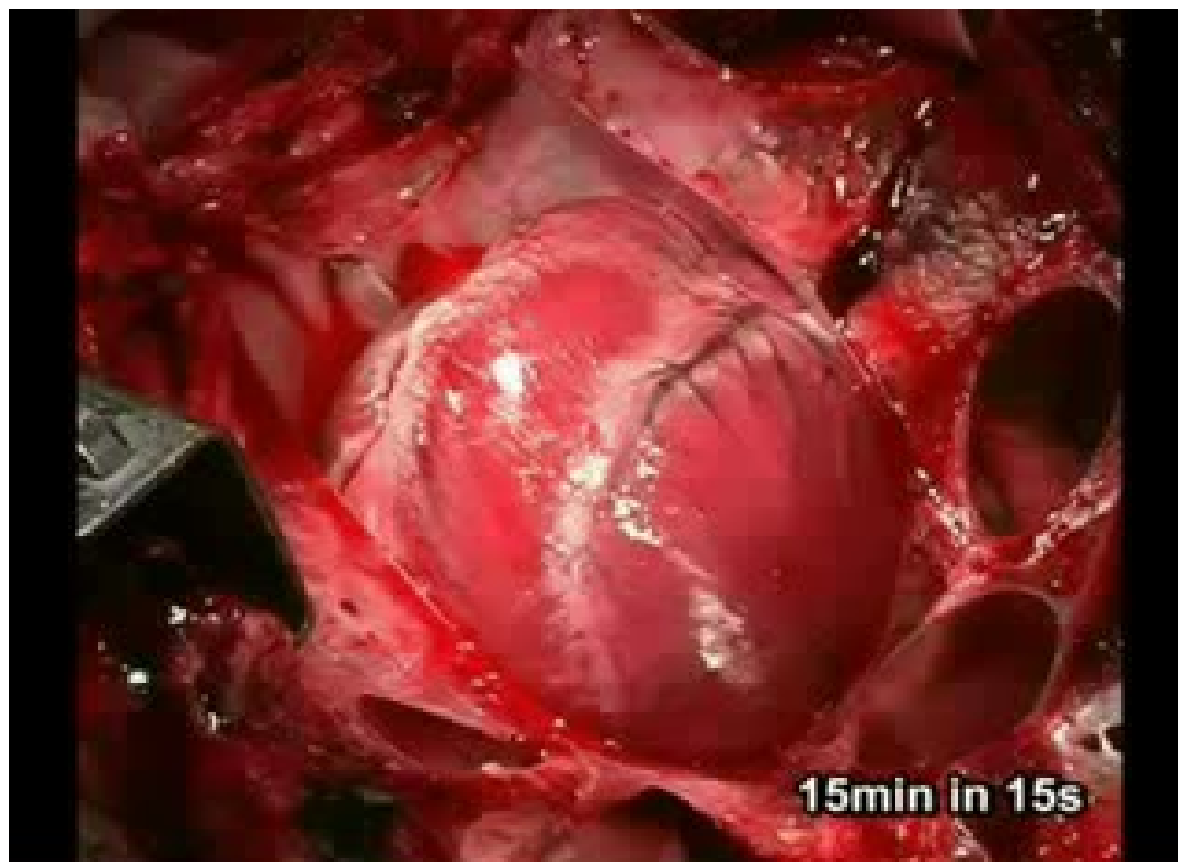


Gedilateerde CMP	↓	=/↓
Restritieve CMP	=	↓



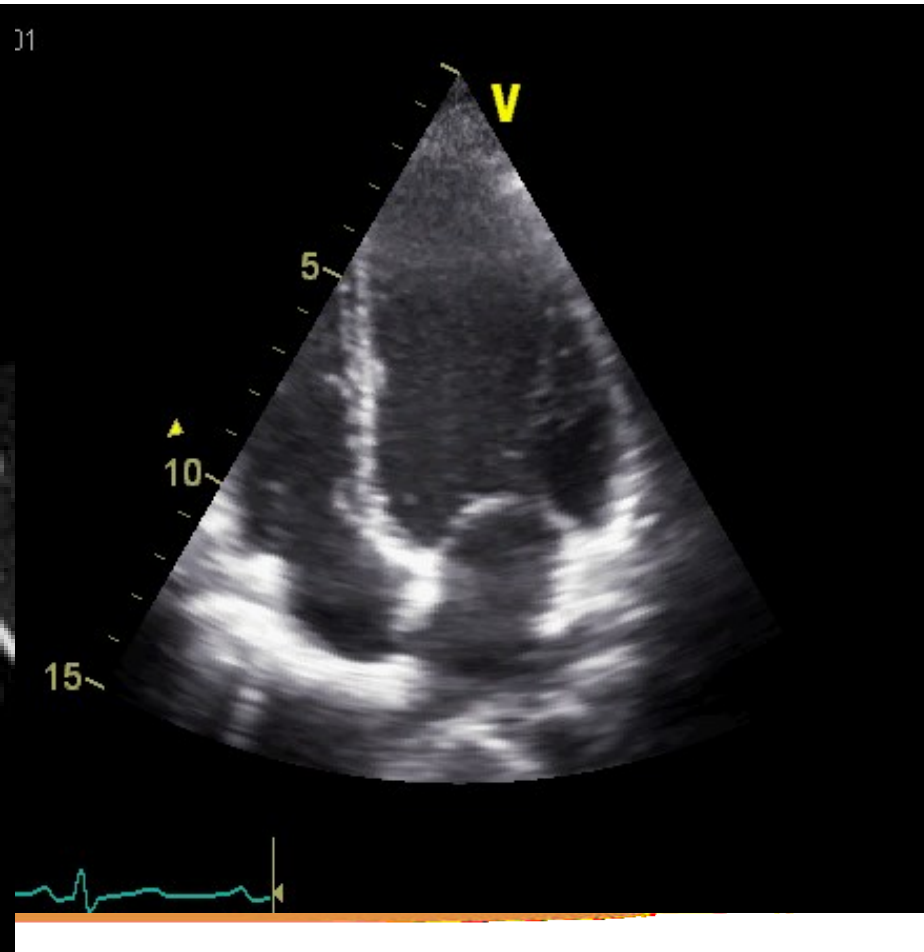








MORFOLOGISCHE DIAGNOSTIEK



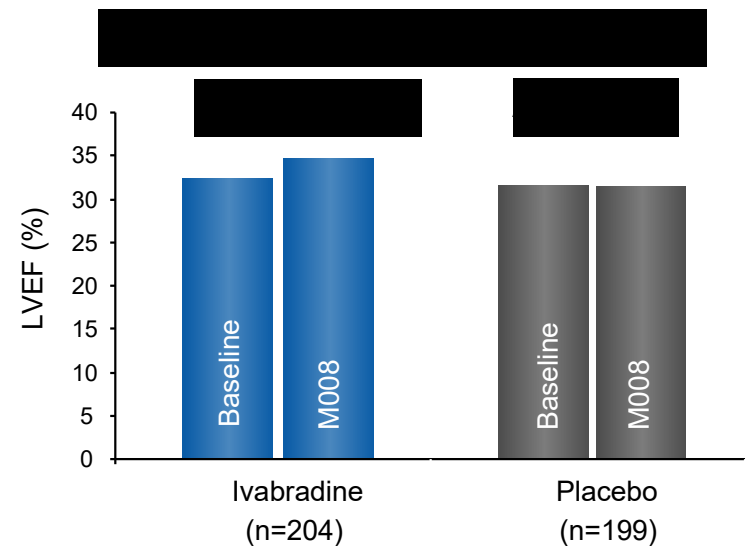
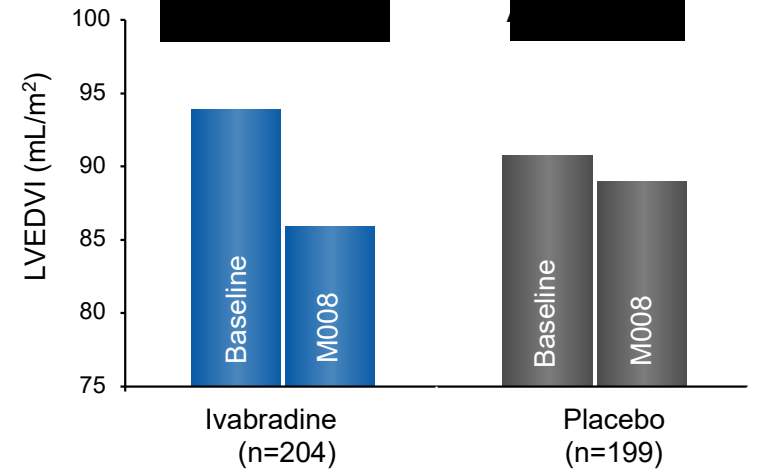
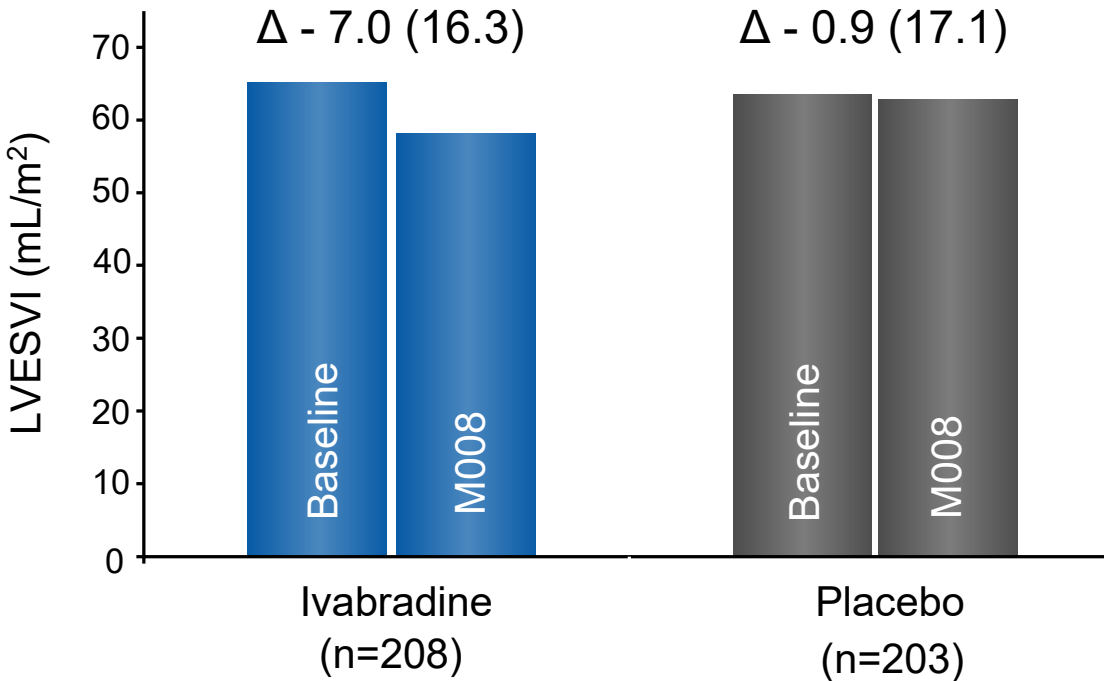


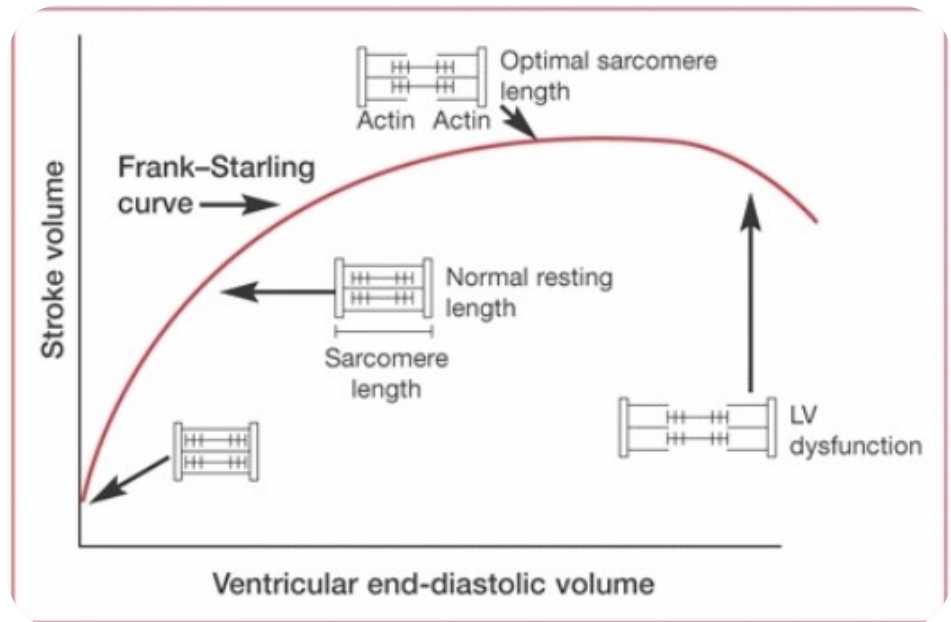
$$\text{BSA (m}^2\text{)} = \sqrt{\frac{\text{Ht (Cm)} \times \text{Wt (kg)}}{3600}}$$

Heart rate reduction with ivabradine on top of beta-blocker and ACEi reverses LV remodeling



E -5.8; $p < 0.001$





Known Causes of Dilated Cardiomyopathy

Ischemia*

Toxins

Ethanol*
Cocaine*
Amphetamines*
Cobalt*
Lead*
Mercury*
Carbon monoxide*
Beryllium

Medications

Chemotherapeutic agents
Doxorubicin
Bleomycin
5-Fluorouracil
Antiretroviral drugs
Zidovudine*
Didanosine*
Zalcitabine*
Phenothiazines*
Chloroquine
Radiation

Miscellaneous

Peripartum cardiomyopathy*
Tachycardia*
Sarcoidosis*
Familial cardiomyopathies
Sleep apnea*
Autoimmune myocarditis
Calcium overload
Oxygen free radical damage

*Potentially reversible causes

Nutritional deficiencies

Thiamine*
Selenium*
Carnitine*

Electrolyte abnormalities

Hypocalcemia*
Hypophosphatemia*
Uremia*

Endocrinologic disorders

Thyroid hormone excess or deficiency*
Growth hormone excess or deficiency*
Pheochromocytoma*
Diabetes mellitus
Cushing's disease

Neuromuscular diseases

Duchenne's muscular
dystrophy
Myotonic dystrophy
Friedreich's ataxia
and others

Rheumatologic diseases

Systemic lupus*
Scleroderma*
Giant cell arteritis*

Infectious diseases

Viral

Coxsackie virus
Cytomegalovirus*
HIV
Varicella
Hepatitis
Epstein-Barr
Echovirus
Other

Bacterial

Streptococci-rheumatic fever
Typhoid fever
Diphtheria*
Brucellosis
Psitticosis

Rickettsial disease

Lyme disease*
Mycobacterial-fungal
Histoplasmosis
Cryptococcosis

Parasitic

Toxoplasmosis*
Trypanosomiasis
Shistosomiasis
Trichinosis

Deposition diseases

Hemochromatosis*
Amyloidosis

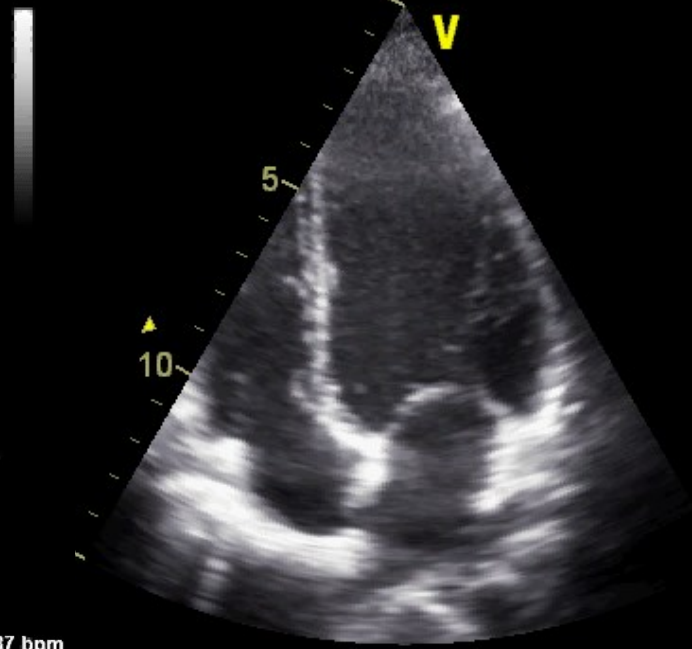
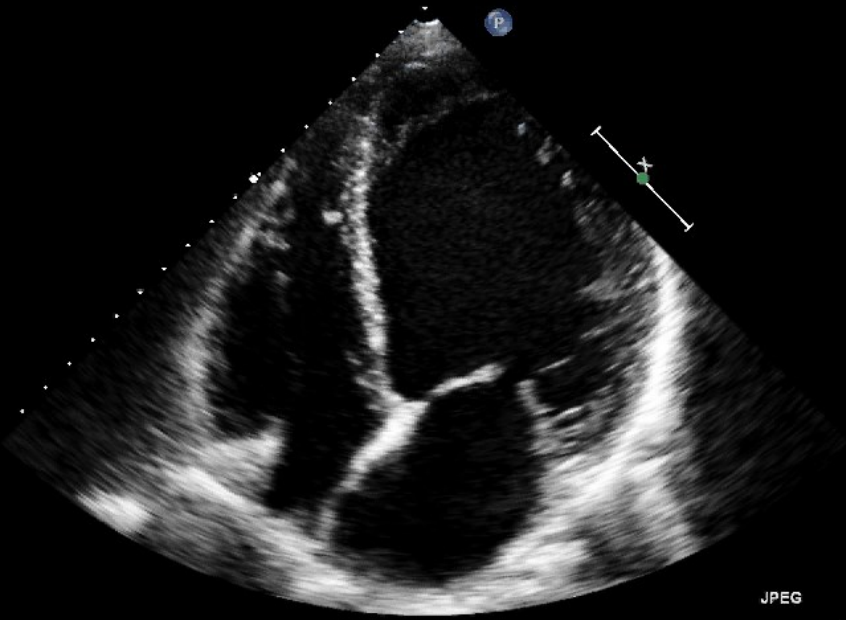




09/06/2011 14:15:28 TISO.7 MI 1.5
S5-1/Cardiac

M3

2D
67%
C 50
P Low
HGen



JPEG

87 bpm

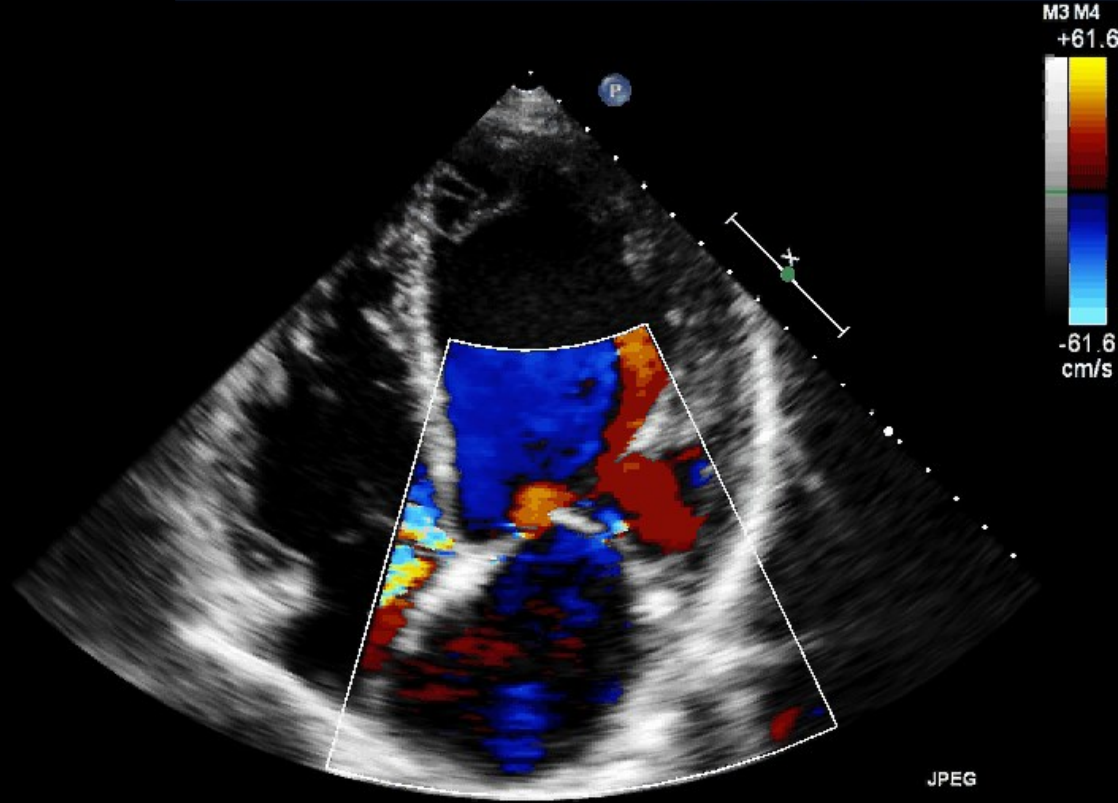


09/06/2011 14:20:01 TIS2.3 MI 1.1

S5-1/Cardiac

2D
69%
C 50
P Low
HGen

CF
73%
2.3MHz
WF High
Med



M3 M4
+61.6
-61.6
cm/s

JPEG

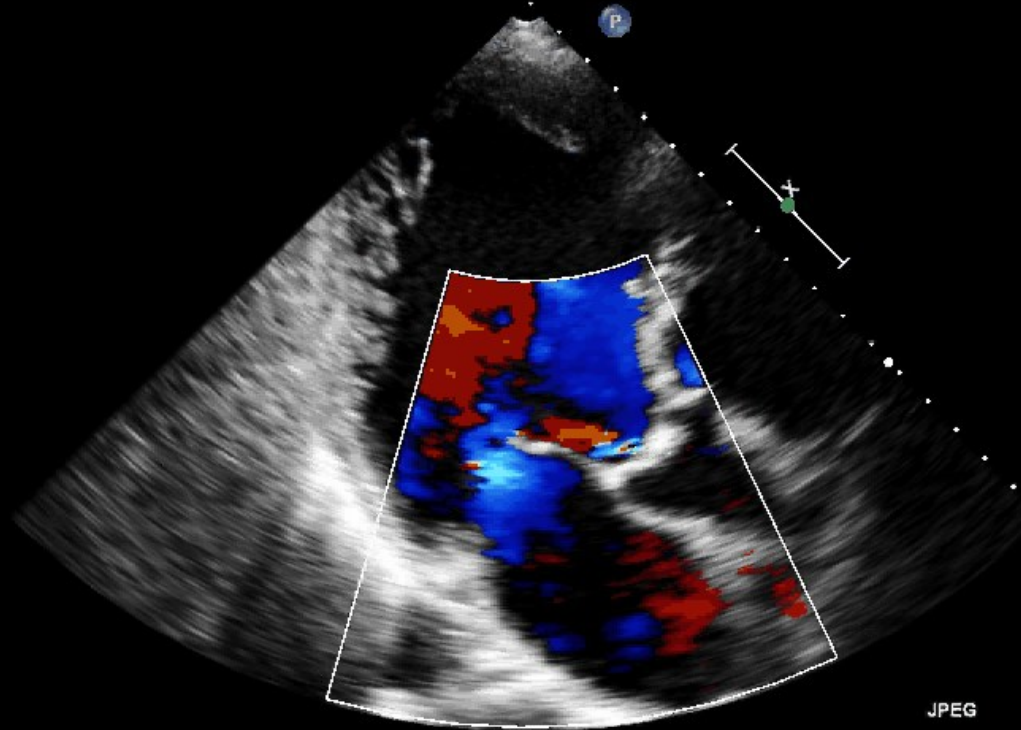
87 bpm

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S5-1/Cardiac

2D
69%
C 50
P Low
HGen

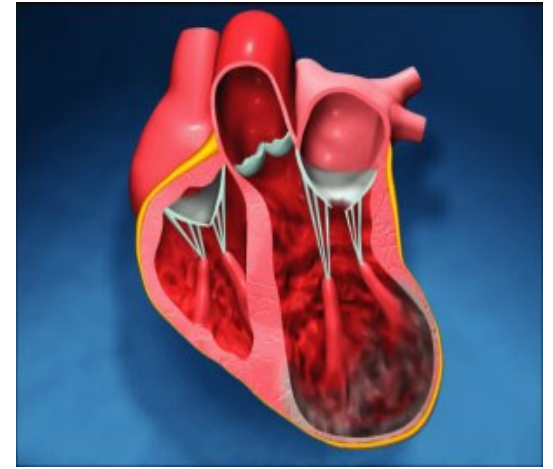
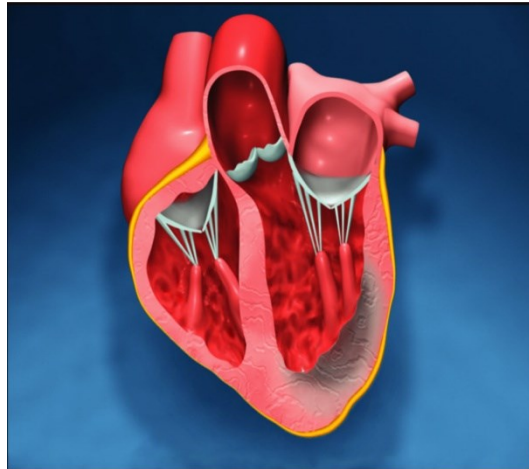
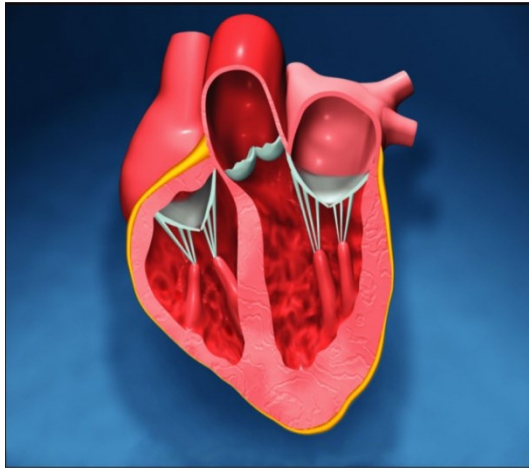
CF
73%
2.3MHz
WF High
Med

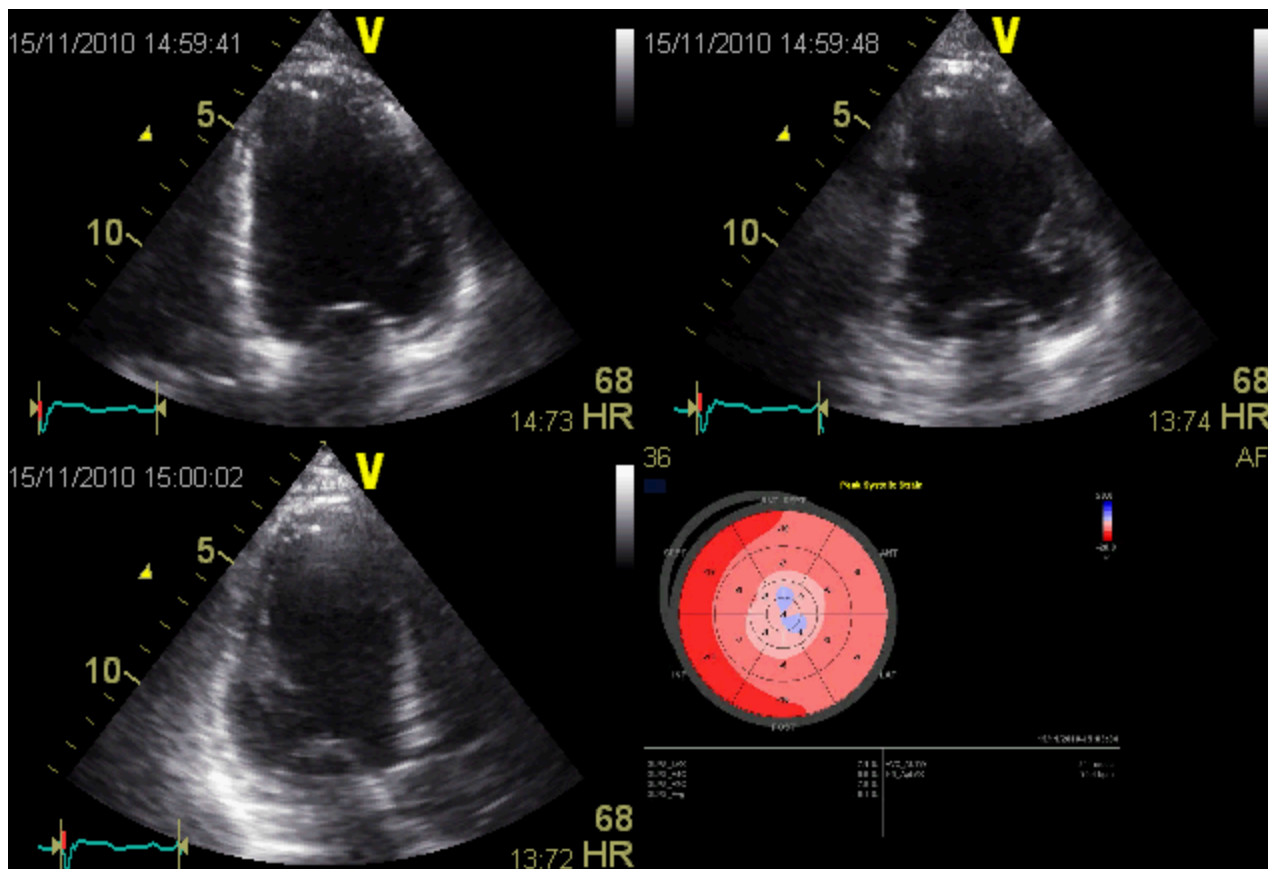


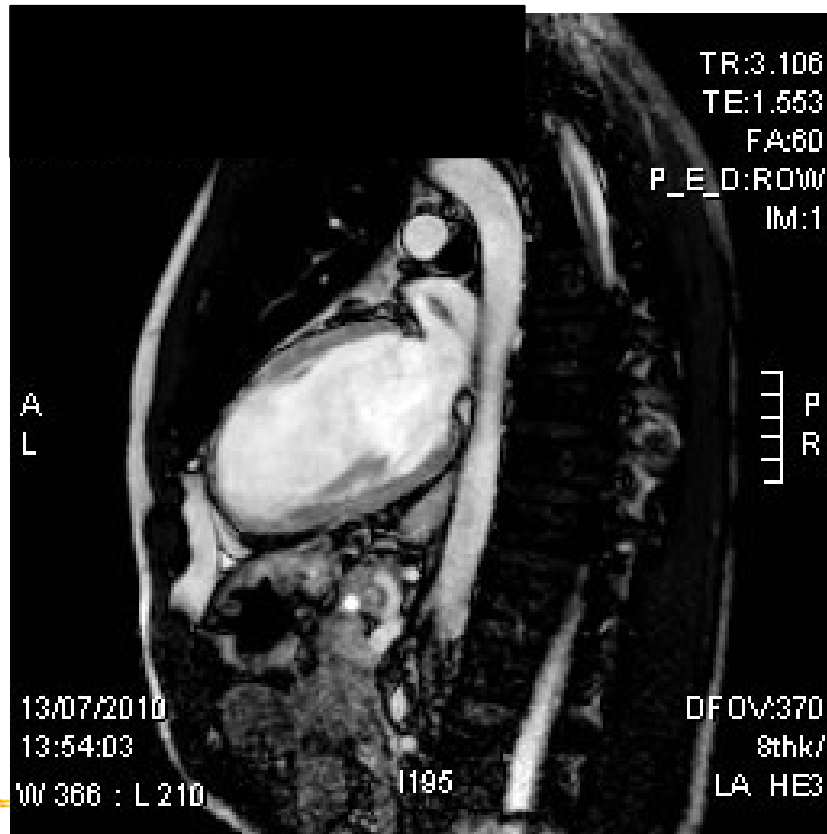
M3 M4
+61.6
-61.6
cm/s

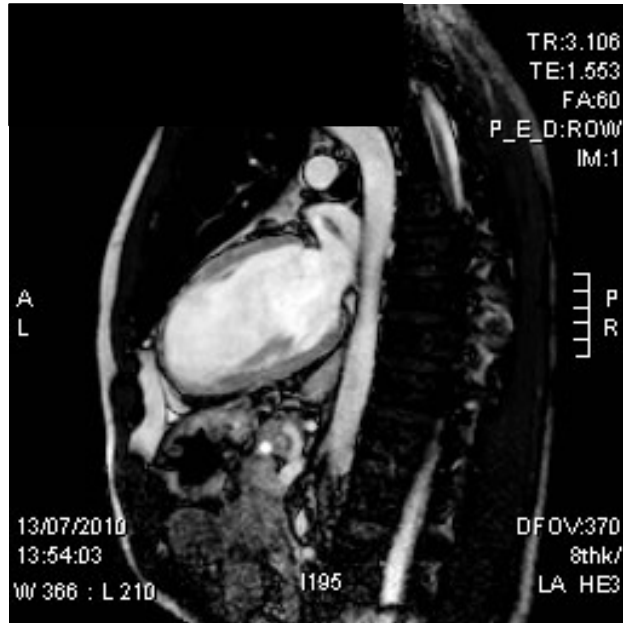
JPEG

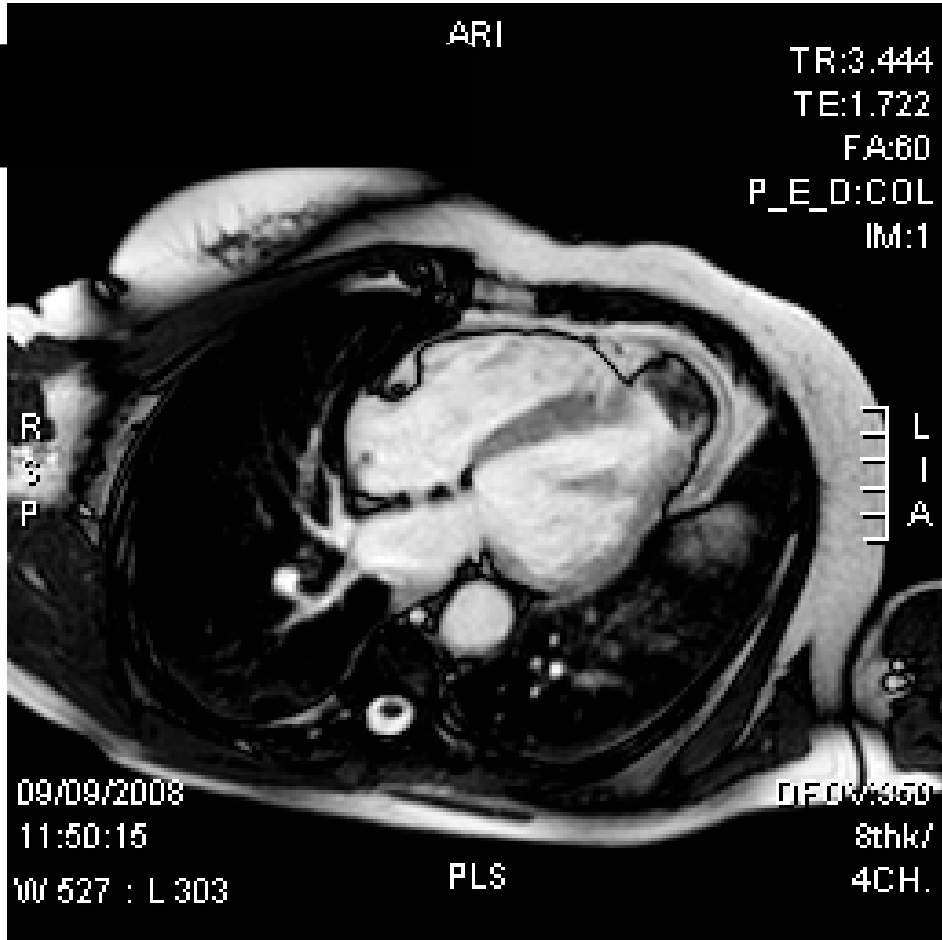
82 bpm



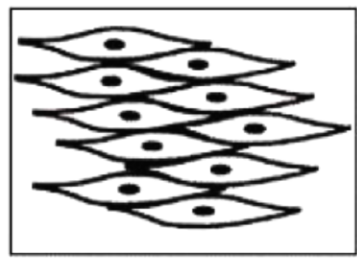








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Normal Muscle Structure



Myocardial Disarray



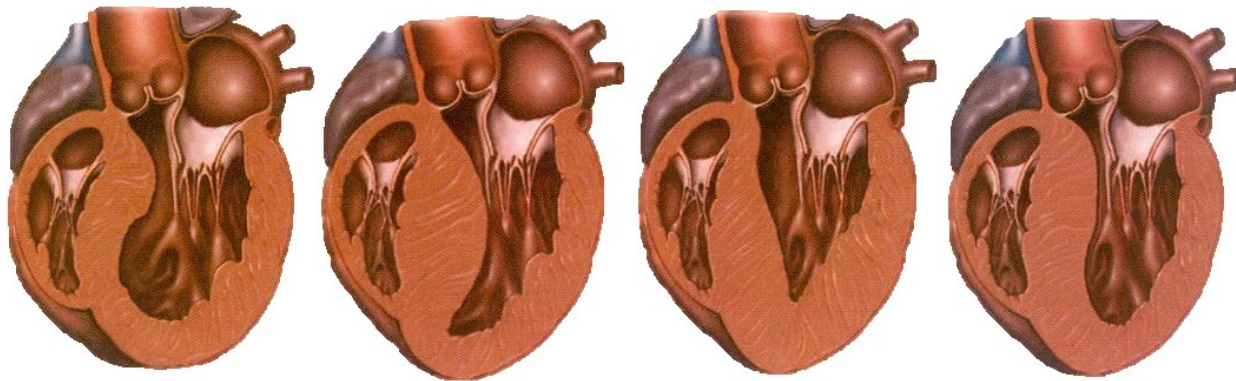
Fysiologisch

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Pathologisch

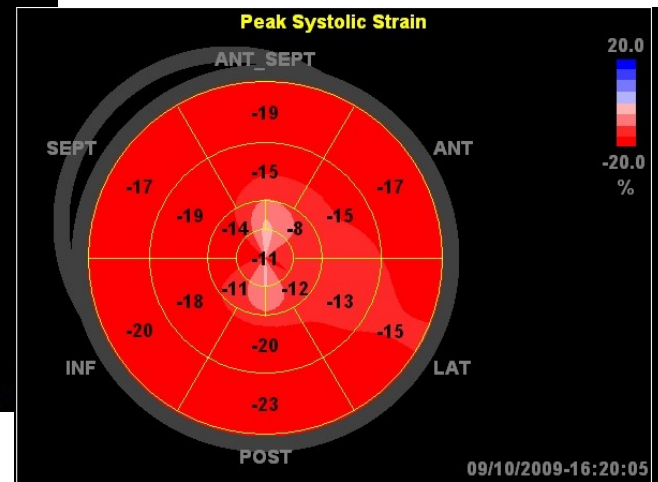
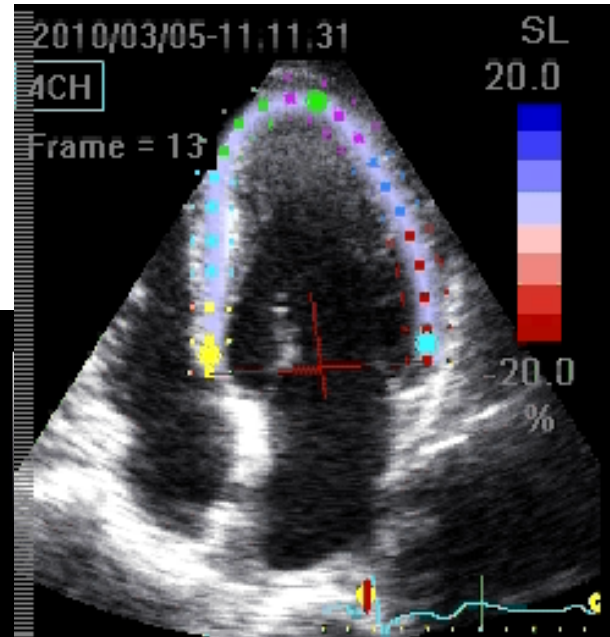
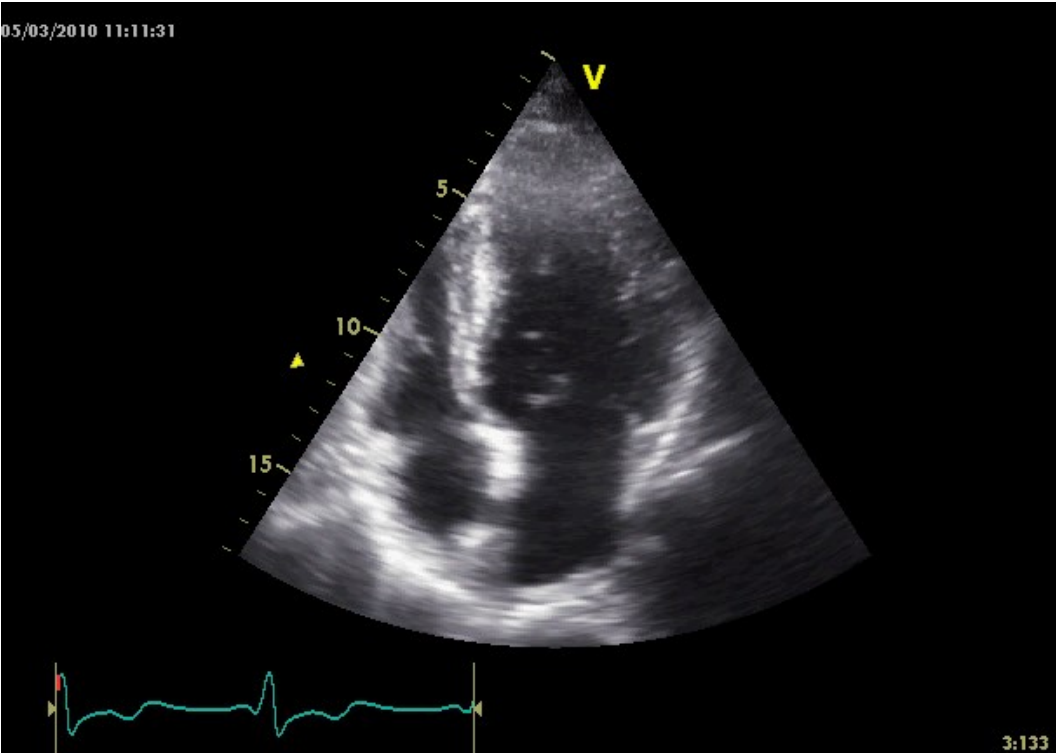
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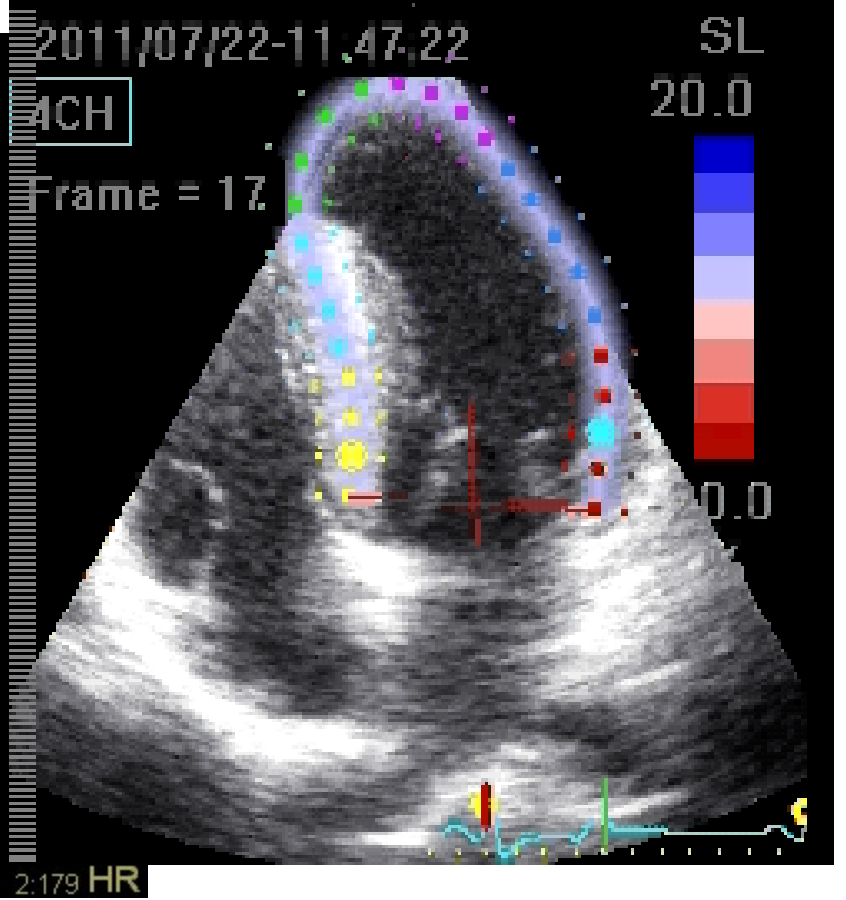
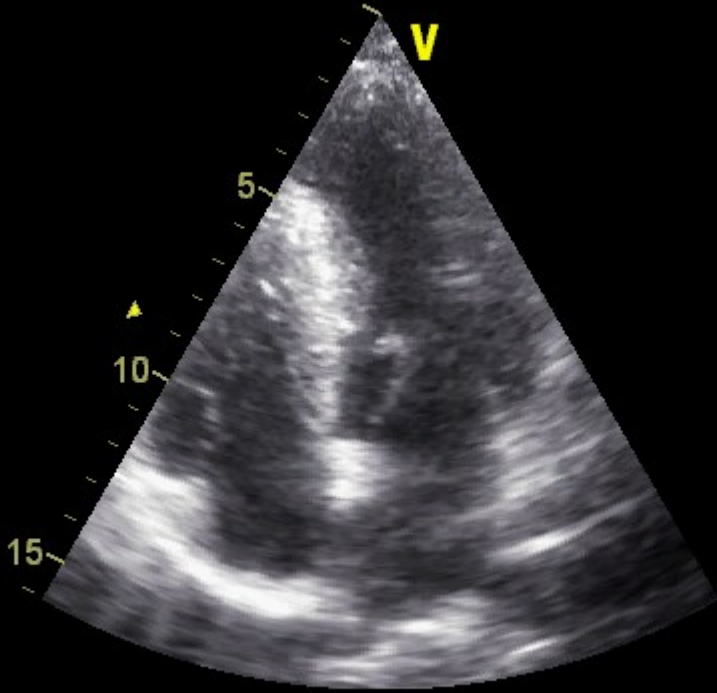
Binder, Ommen et al. Mayo Clin Proc 2006;81:459-67
Bos, Theis et al. Am Heart J 2008;155:1128

Chromosomal Locus	Gene	Protein	Inheritance
1q32	<i>TNNT2</i>	Cardiac troponin T	AD
2q31	<i>TTN</i>	Titin	AD
3p21	<i>MYL3</i>	Ventricular essential myosin light chain	AD & AR(?)
7q36	<i>PRKAG2</i>	AMPK- γ 2 subunit	AD
11p11	<i>MYBPC3</i>	Cardiac myosin-binding protein C	AD
11p15	<i>CSRP3</i>	Cardiac muscle LIM protein	AD
12q23-q24	<i>MYL2</i>	Ventricular regulatory myosin light chain	AD
14q12	<i>MYH7</i>	β -myosin heavy chain	AD
15q14	<i>ACTC</i>	α -cardiac actin	AD
15q22	<i>TPM1</i>	α -tropomyosin	AD
19q13	<i>TNN13</i>	Cardiac troponin 1	AD
Xq24	<i>LAMP2</i>	Lysosome-associated membrane protein 2	X-linked

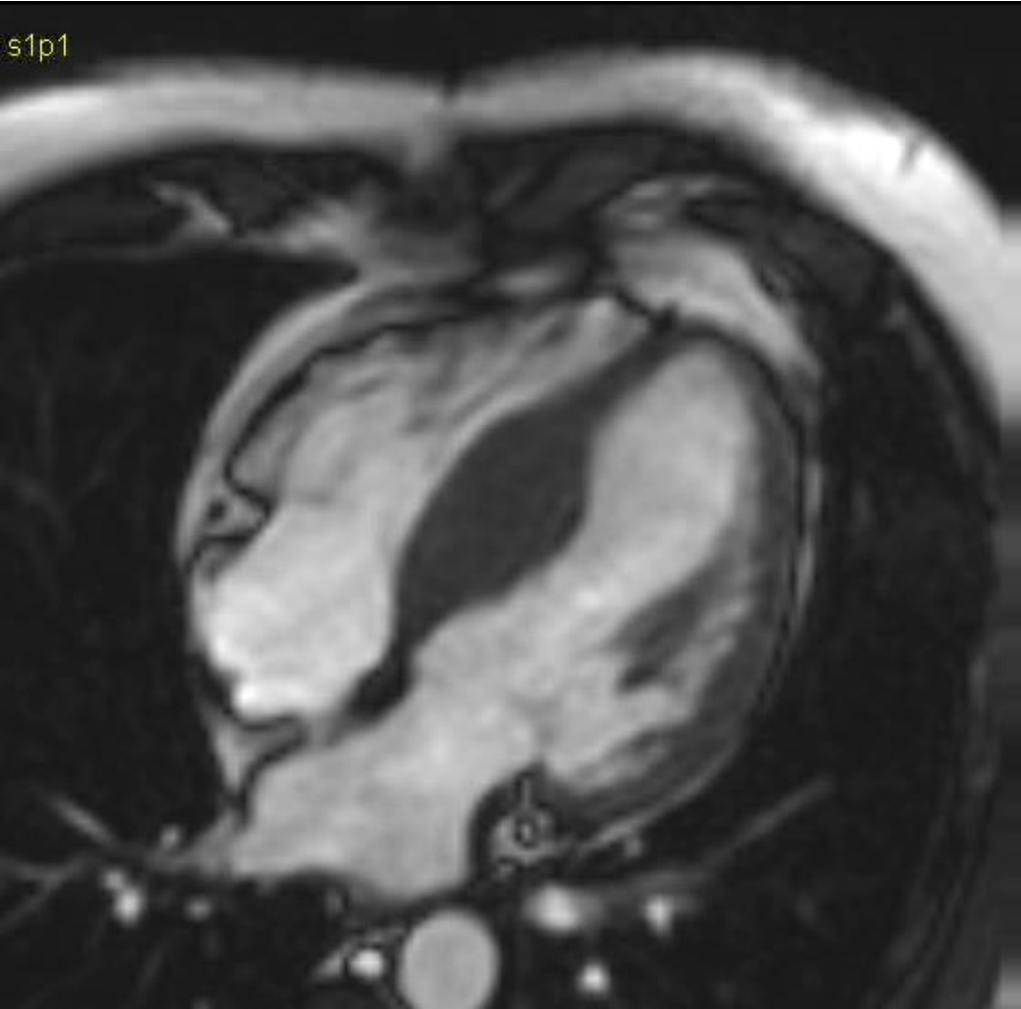


GLPS_LAX	-15.0 %	AVC_STORED	361 msec
GLPS_A4C	-16.3 %	HR_ApLAX	64.4 bpm
GLPS_A2C	-15.5 %		
GLPS_Avg	-15.6 %		

11 11:47:22



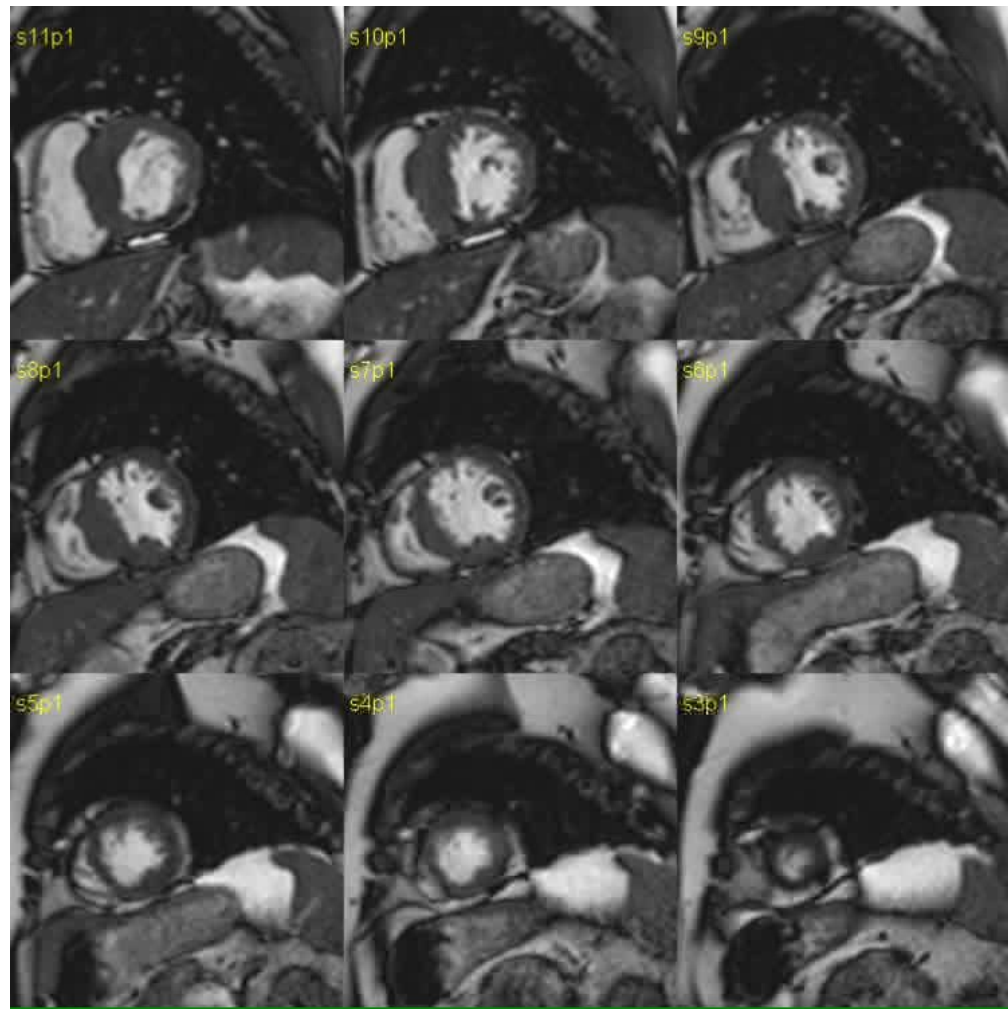
s1p1



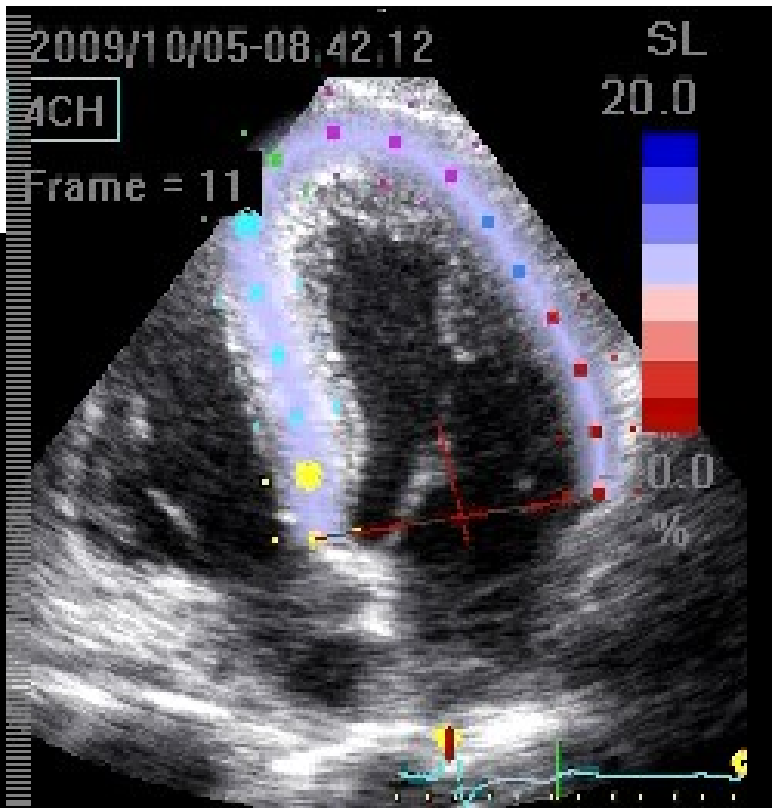
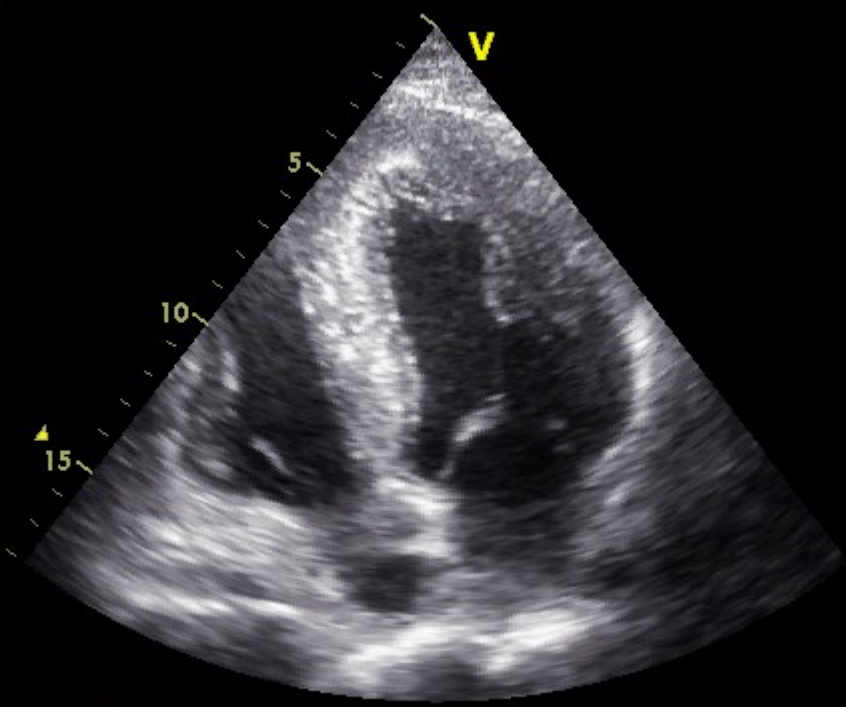


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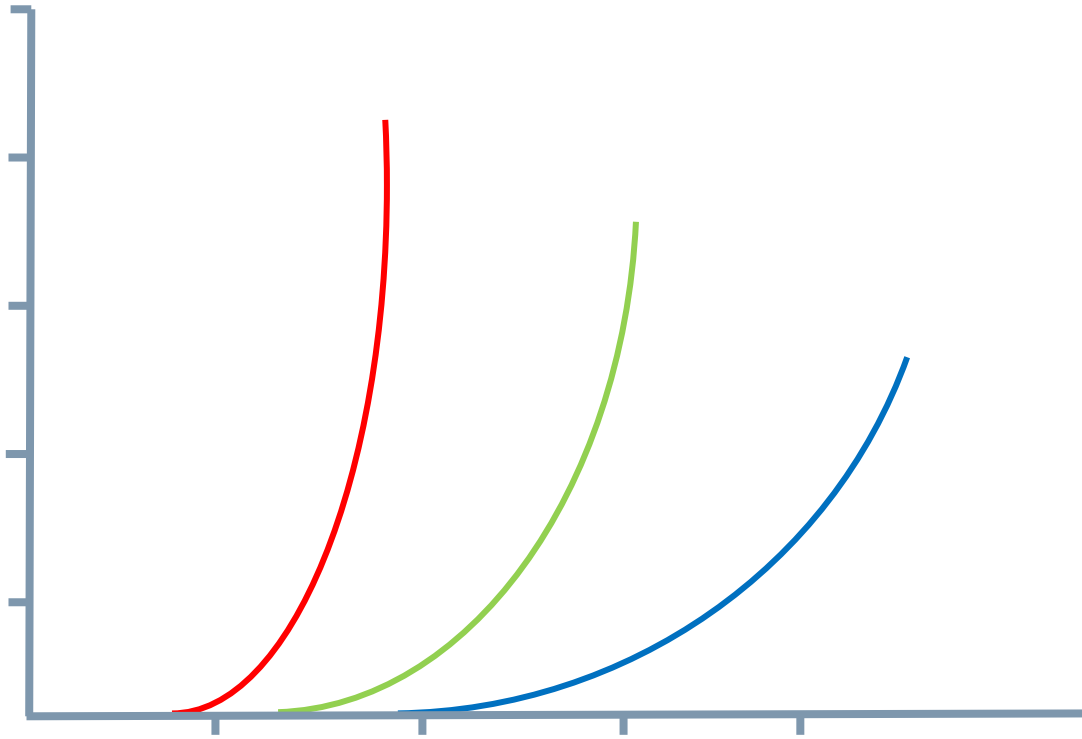


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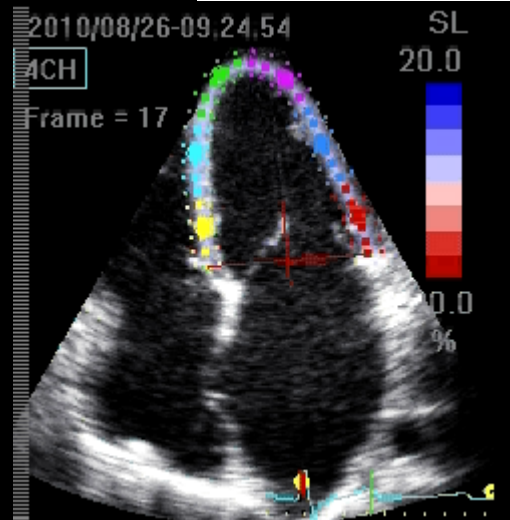
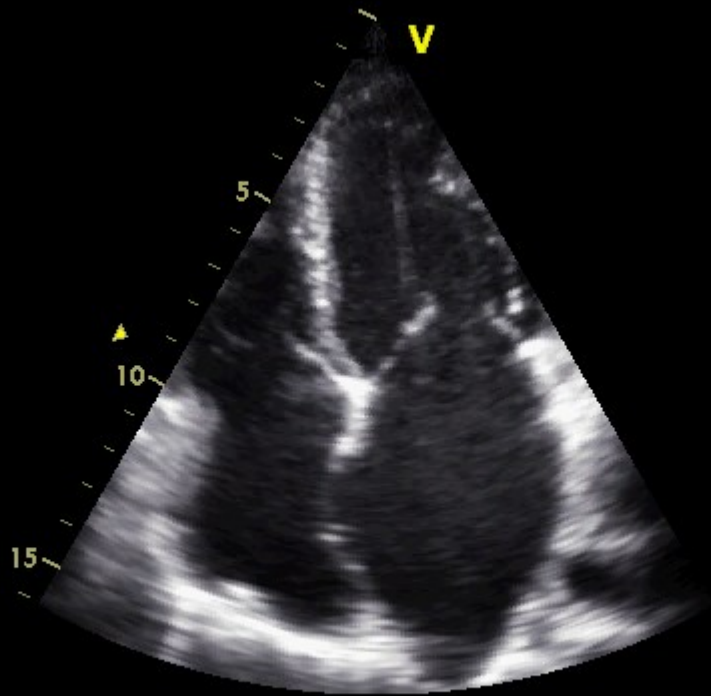


2:115 60 HR



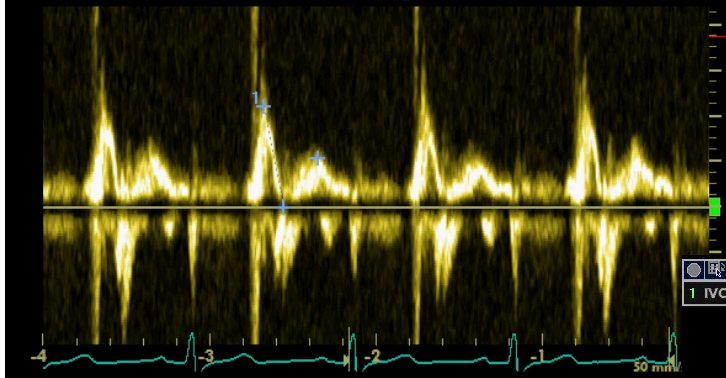
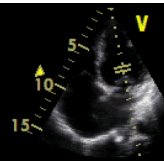


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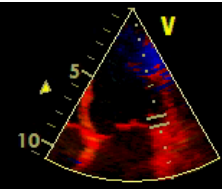


63
2:174 HR

1 MV E Vel 0.4 m/s
MV DecT 117 ms
MV A Vel 0.2 m/s
MV E/A Ratio 2.1



E/E' 10.71
1 E' 0.04 m/s



.16

15

10

5

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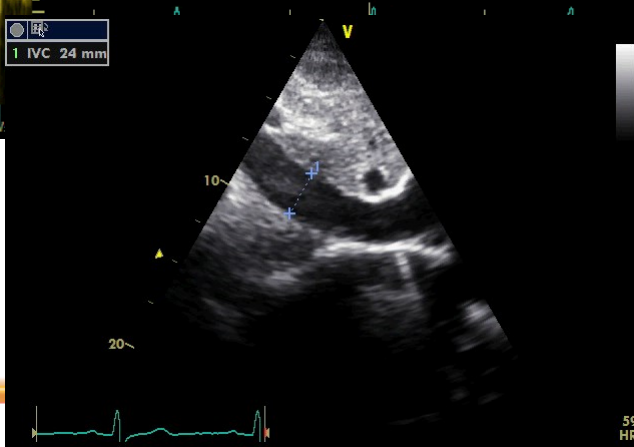
-5

-10

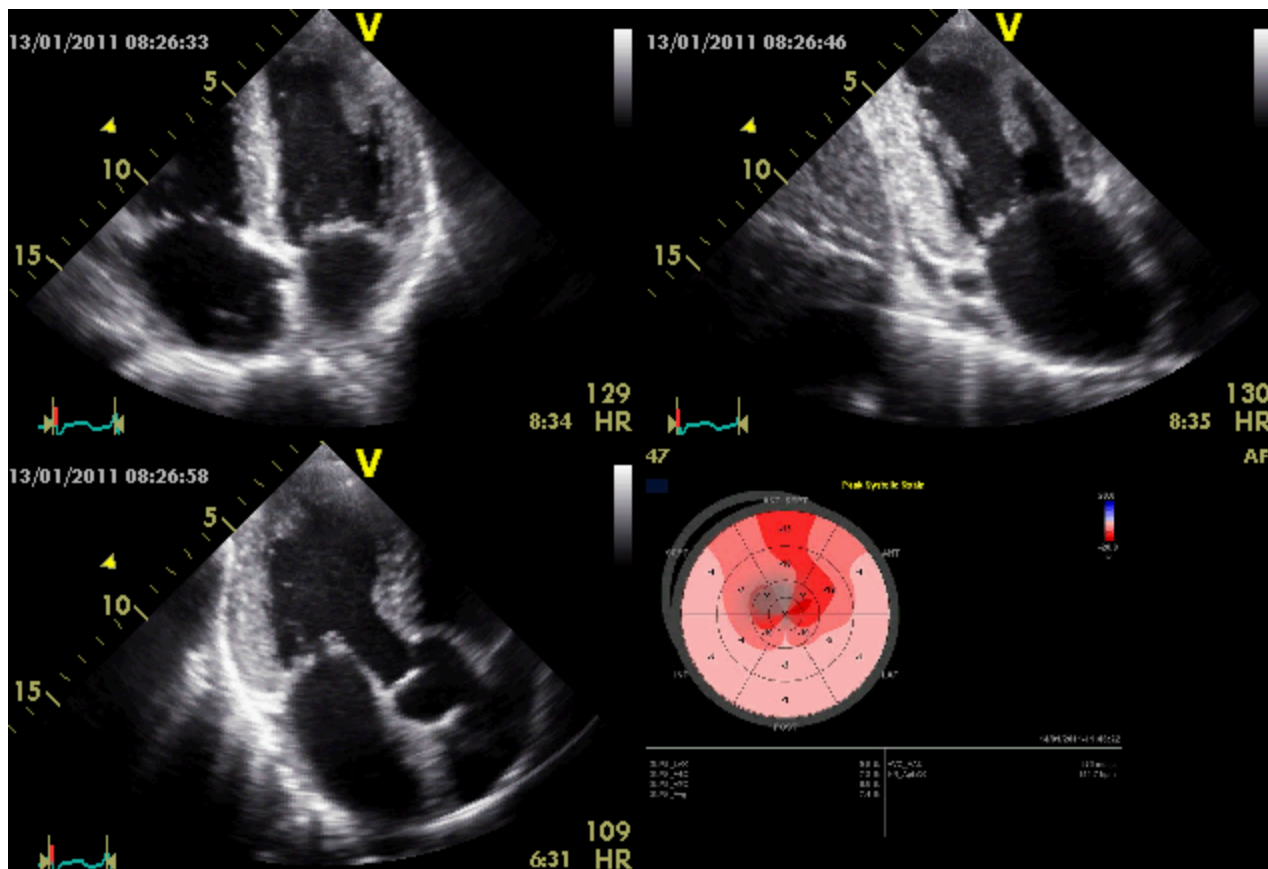
-15

60 HR

1 IVC 24 mm



59 HR



28/07/2009 12:03:57

V

2009/07/28-12,03,57

4CH

Frame = 9



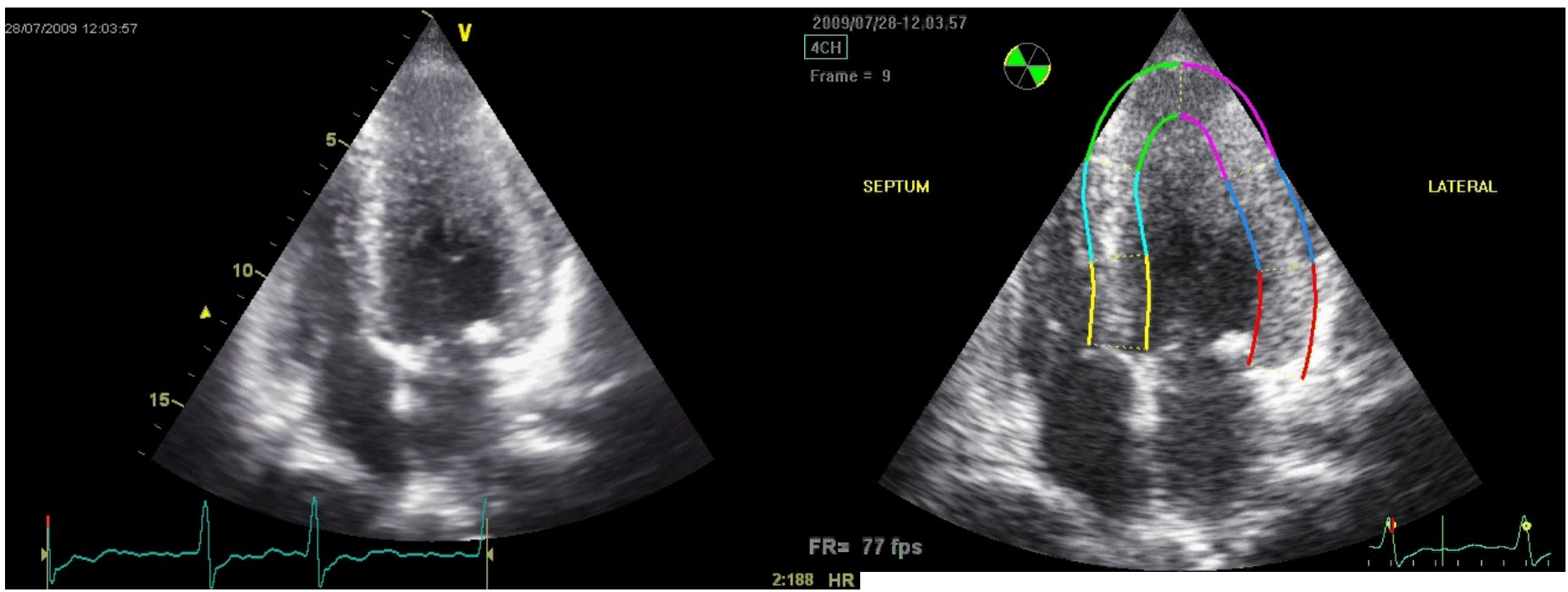
5
10
15

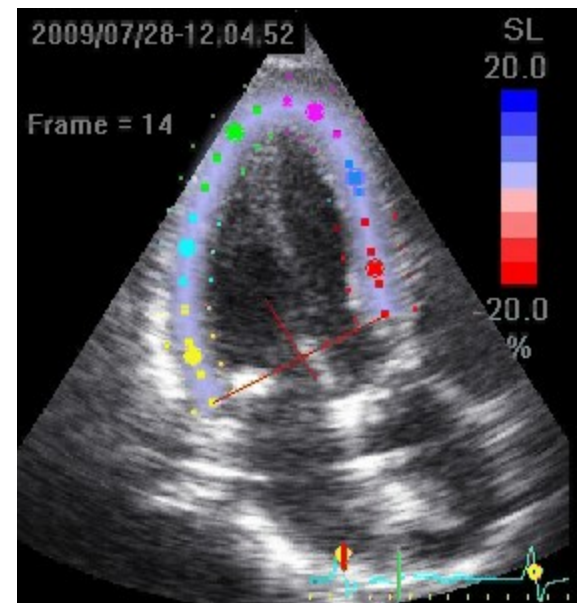
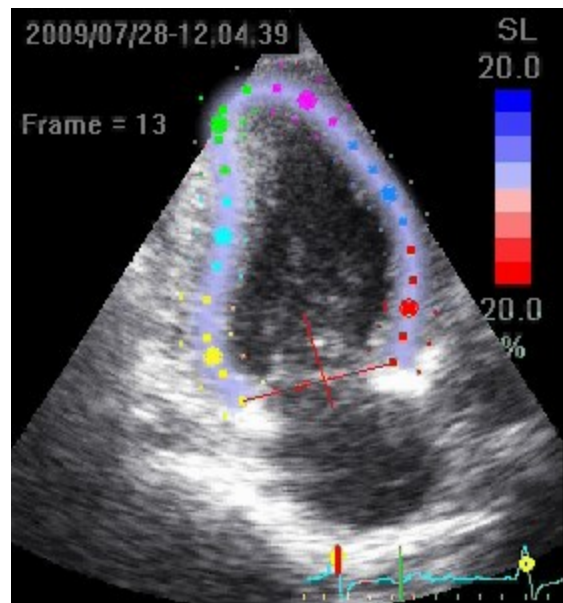
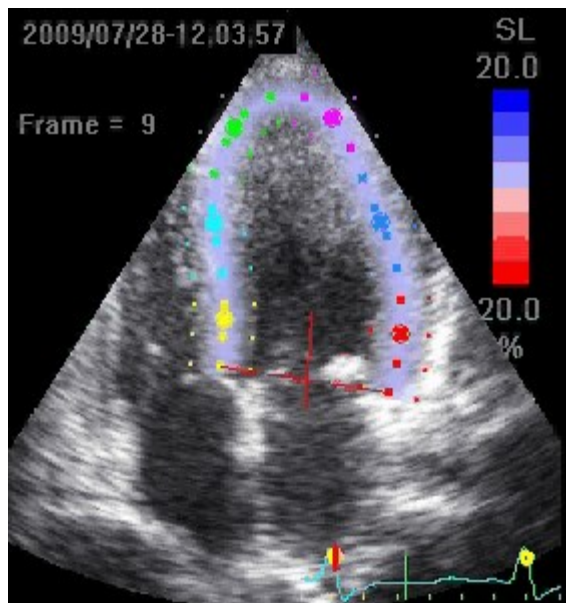
SEPTUM

LATERAL

FR= 77 fps

2:188 HR

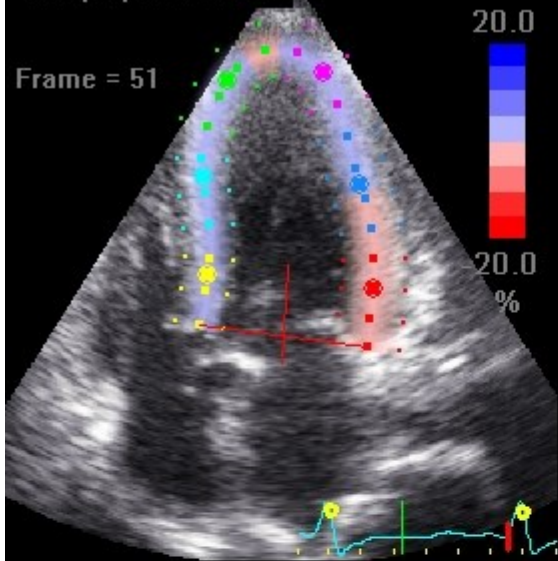




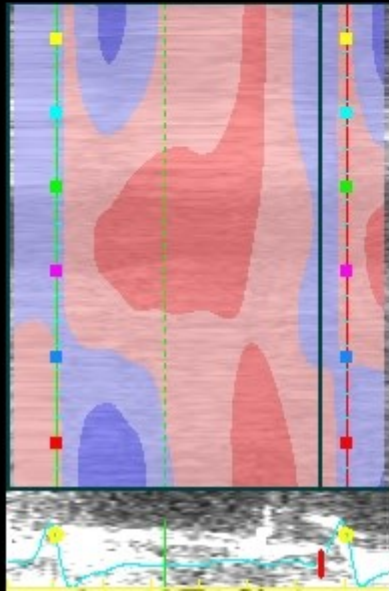
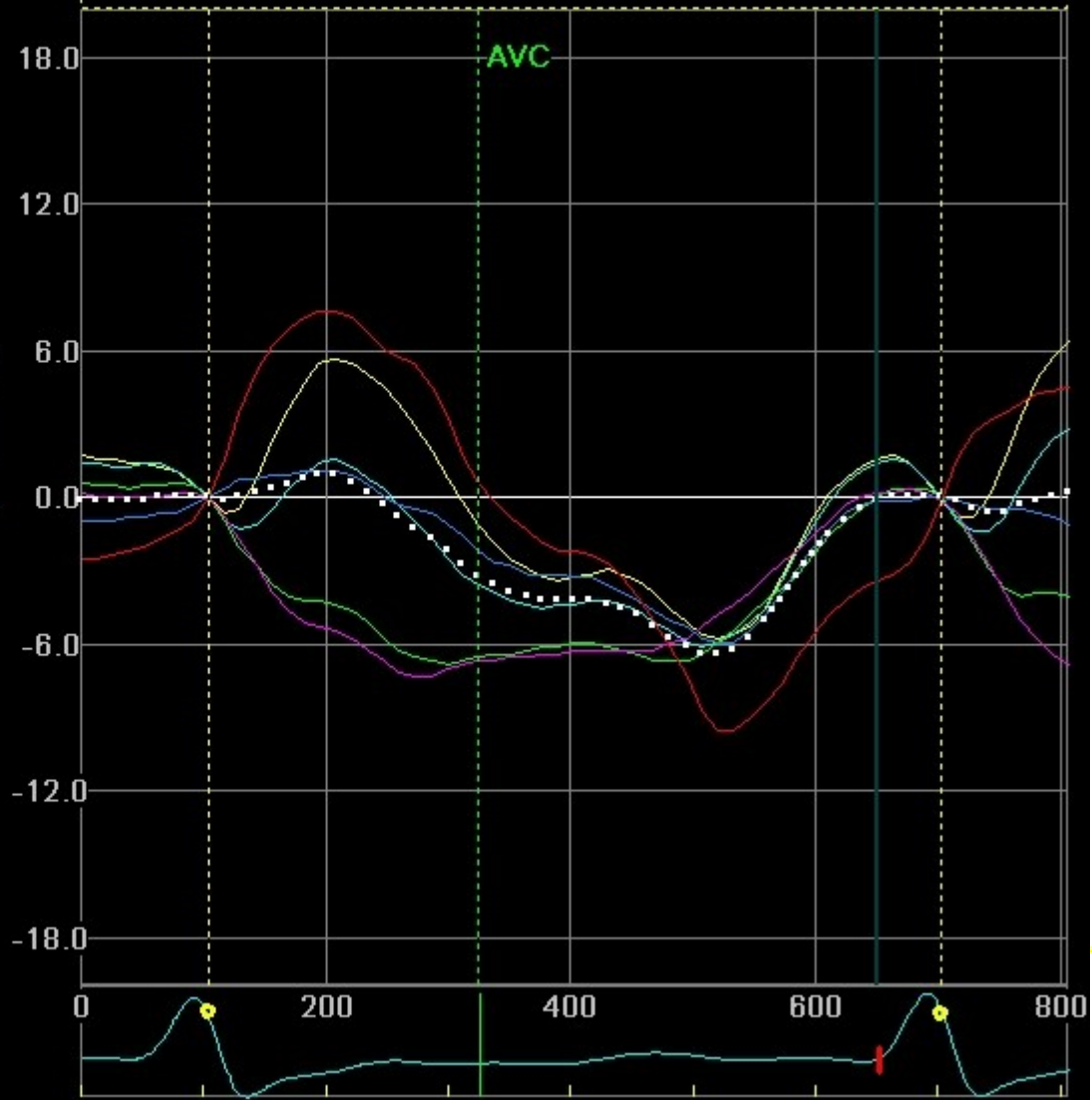
2009/07/28-12:03:57

Frame = 51

SL
20.0
20.0
%

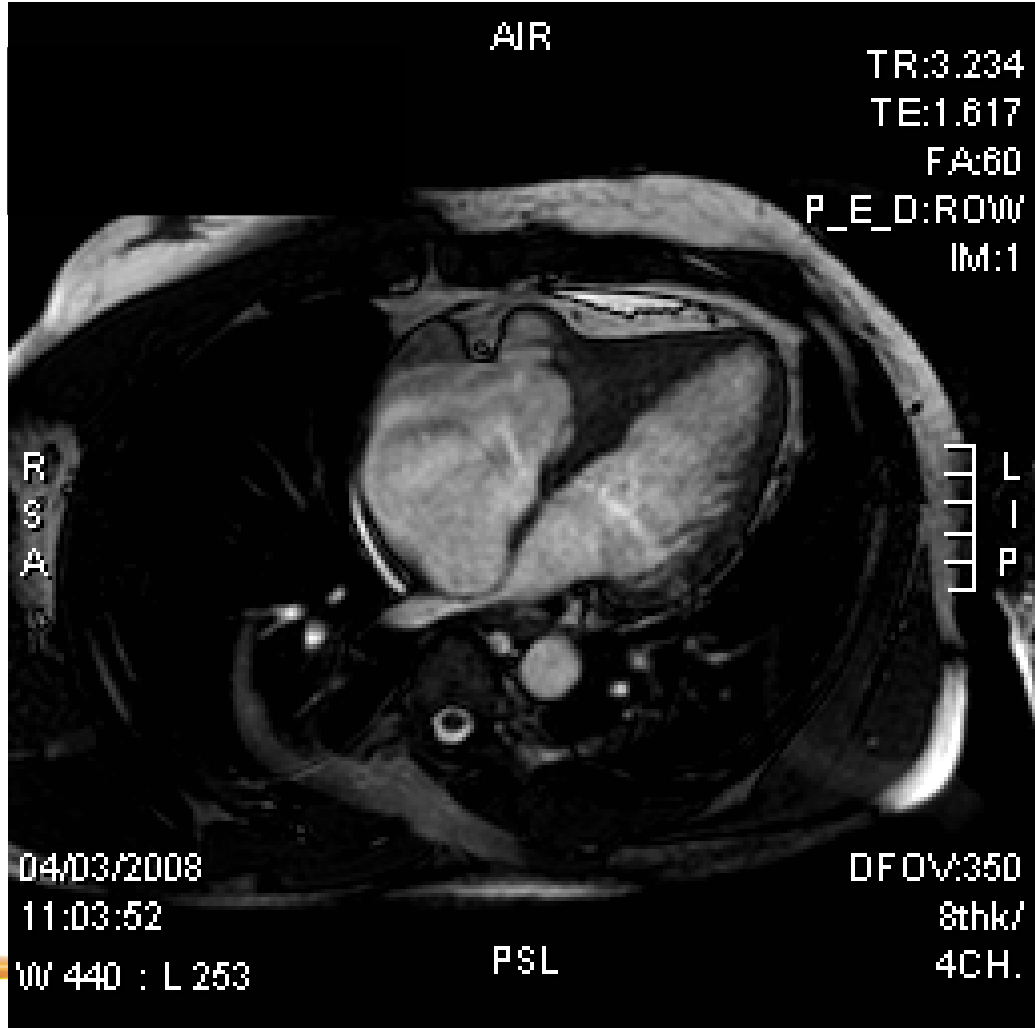


LOCAL: Longitudinal Strain (%) = -6.25 T=651 msec



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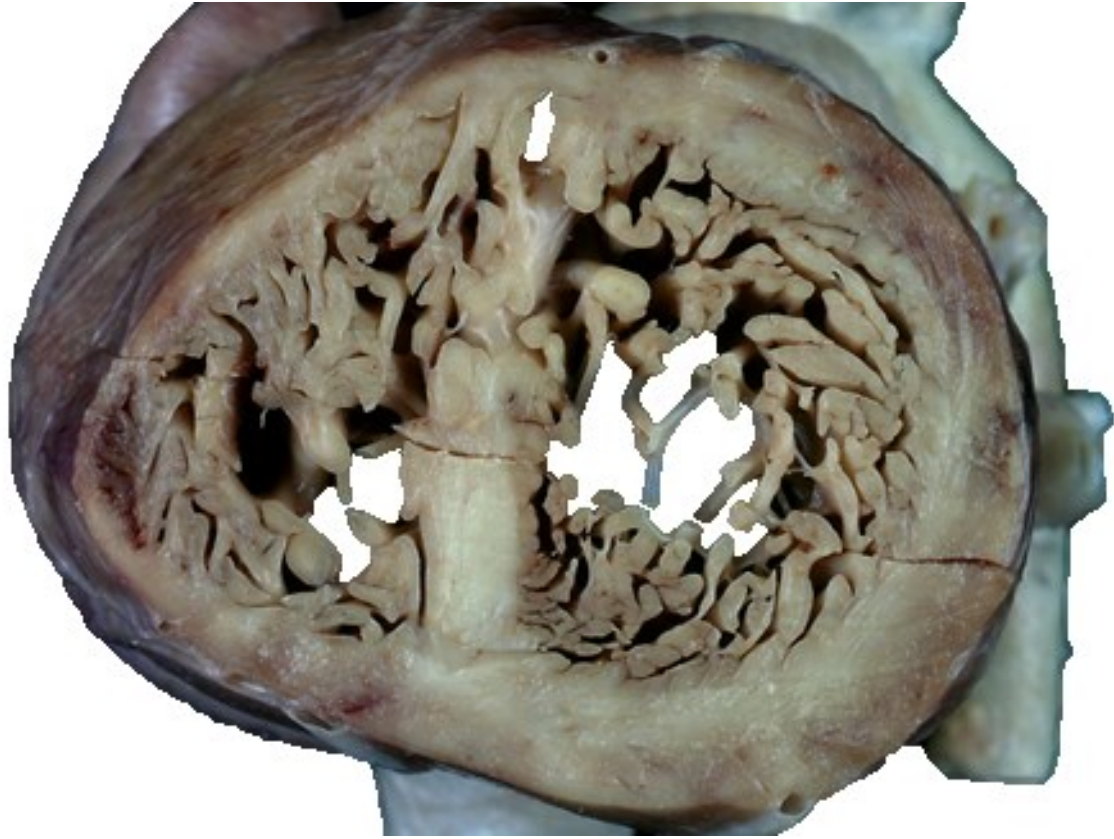
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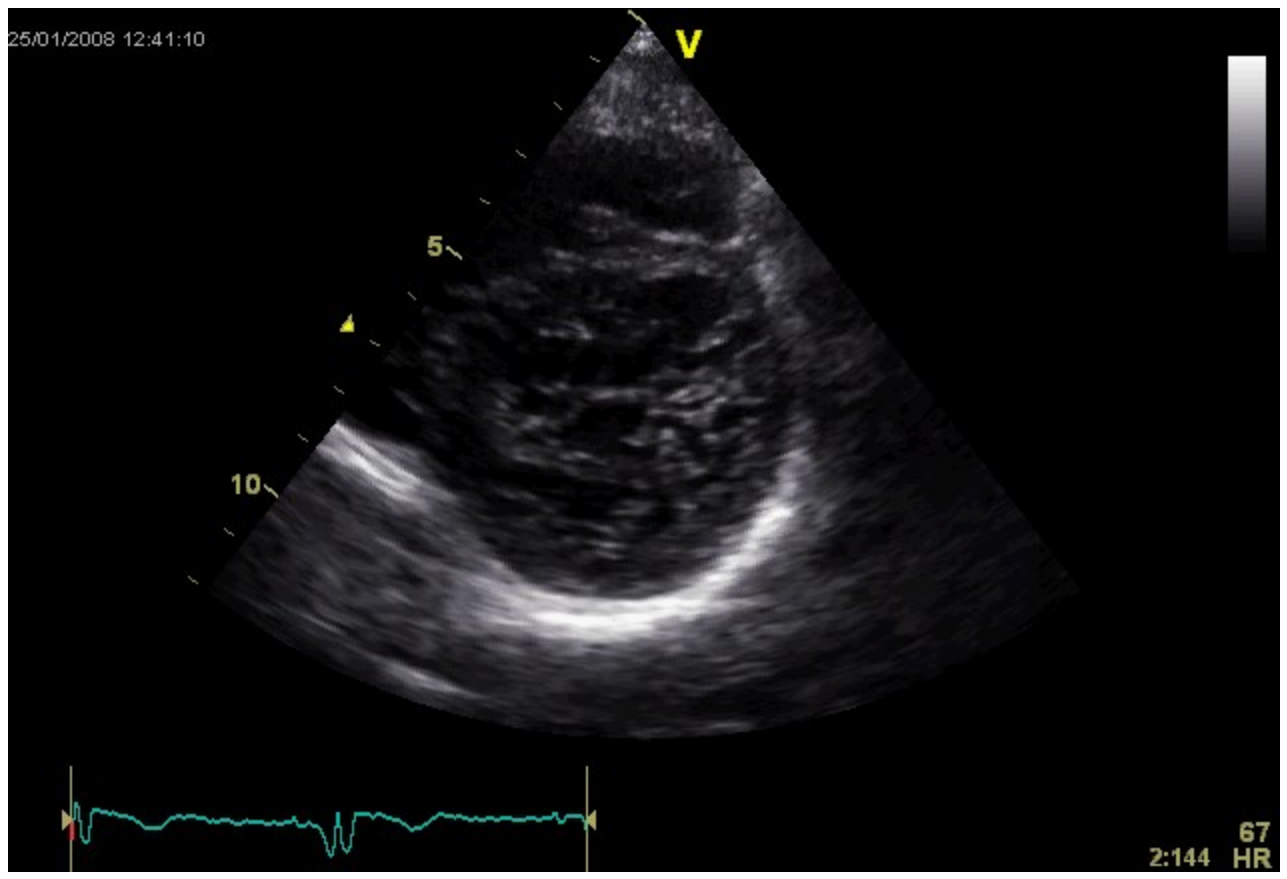
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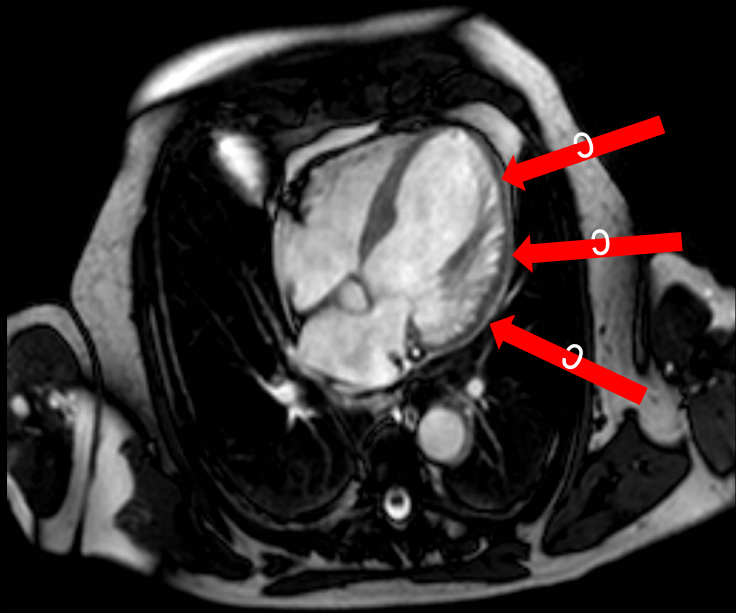




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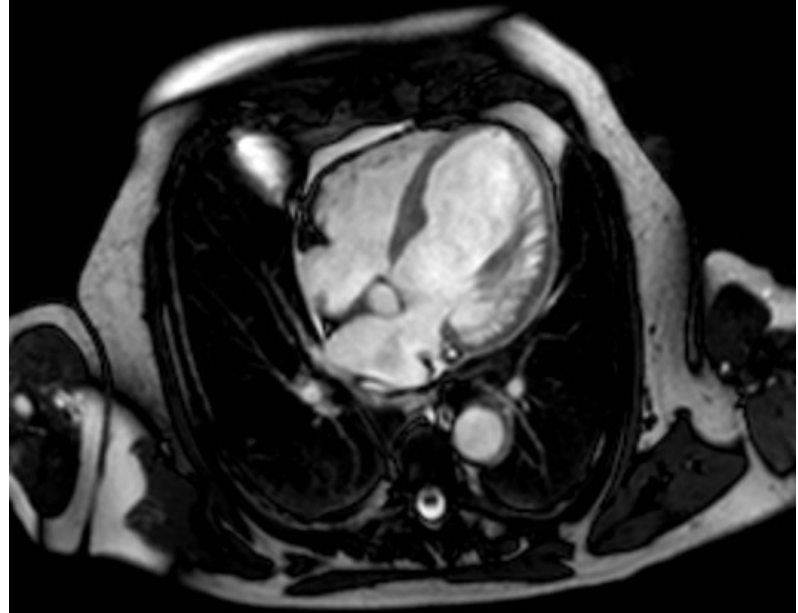


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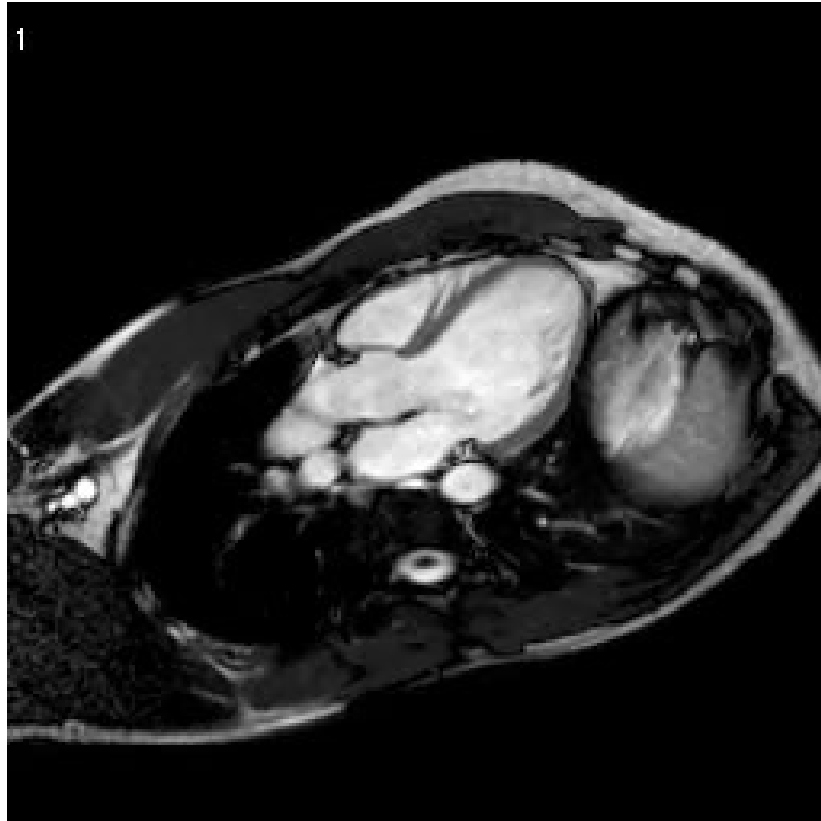


W 750 : L 431

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W 757 : L 435



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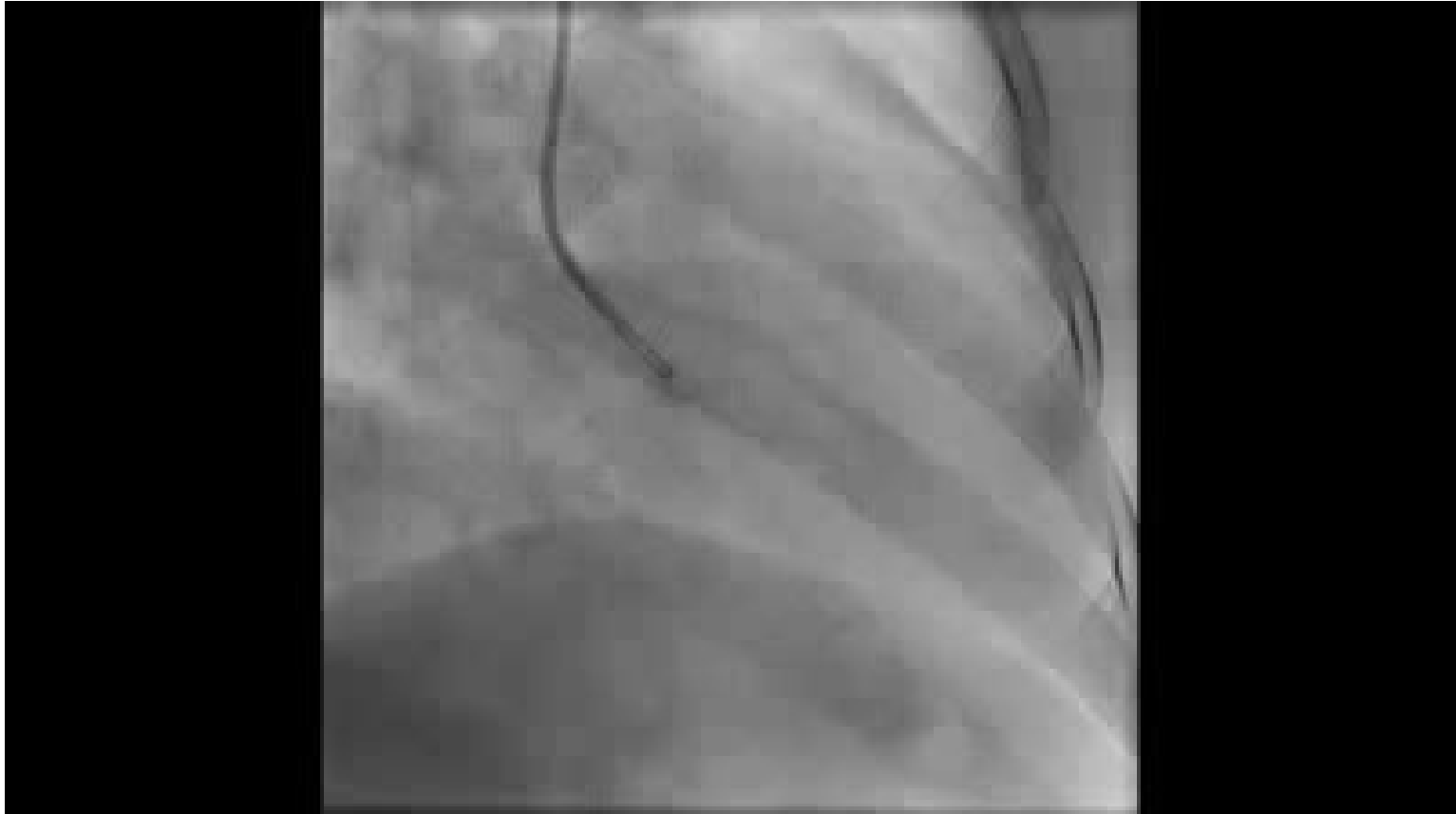
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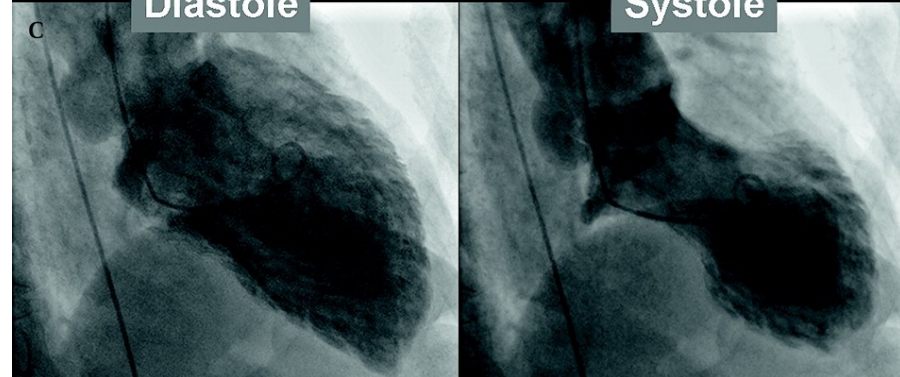
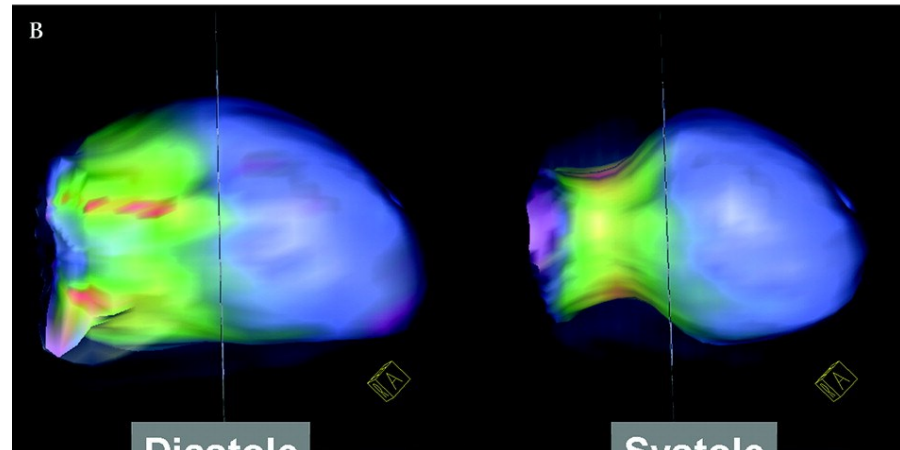
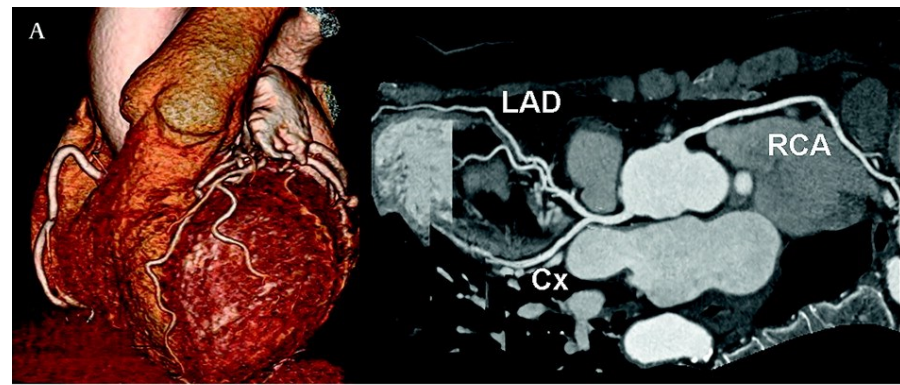
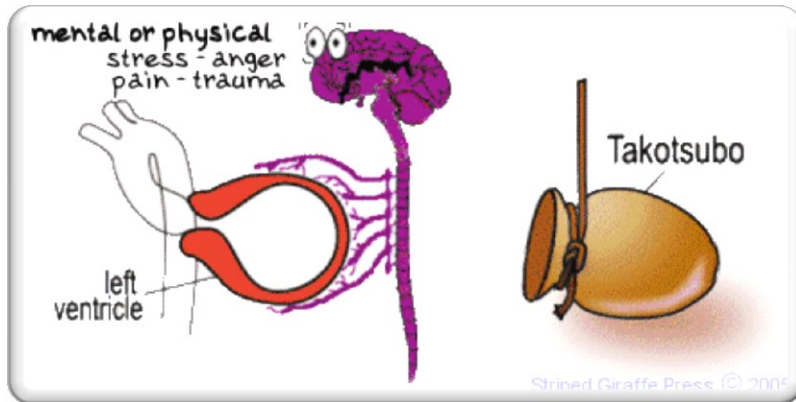
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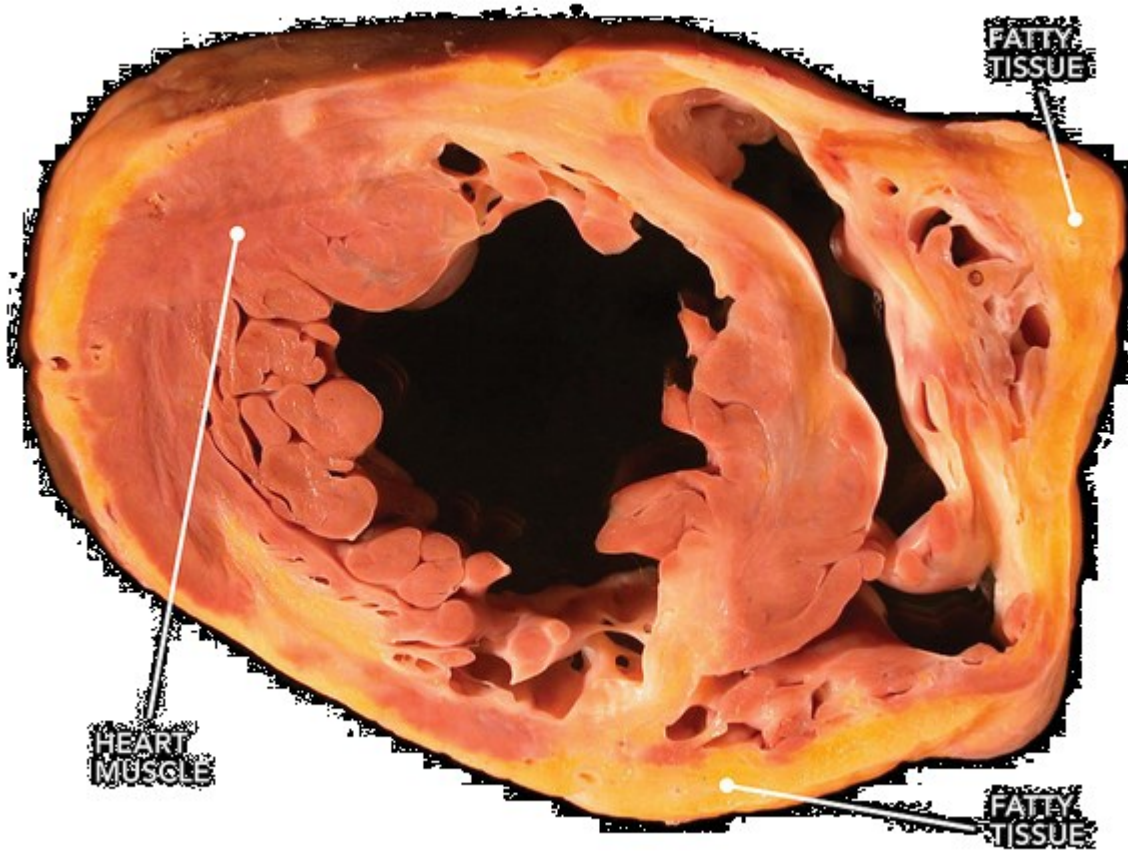






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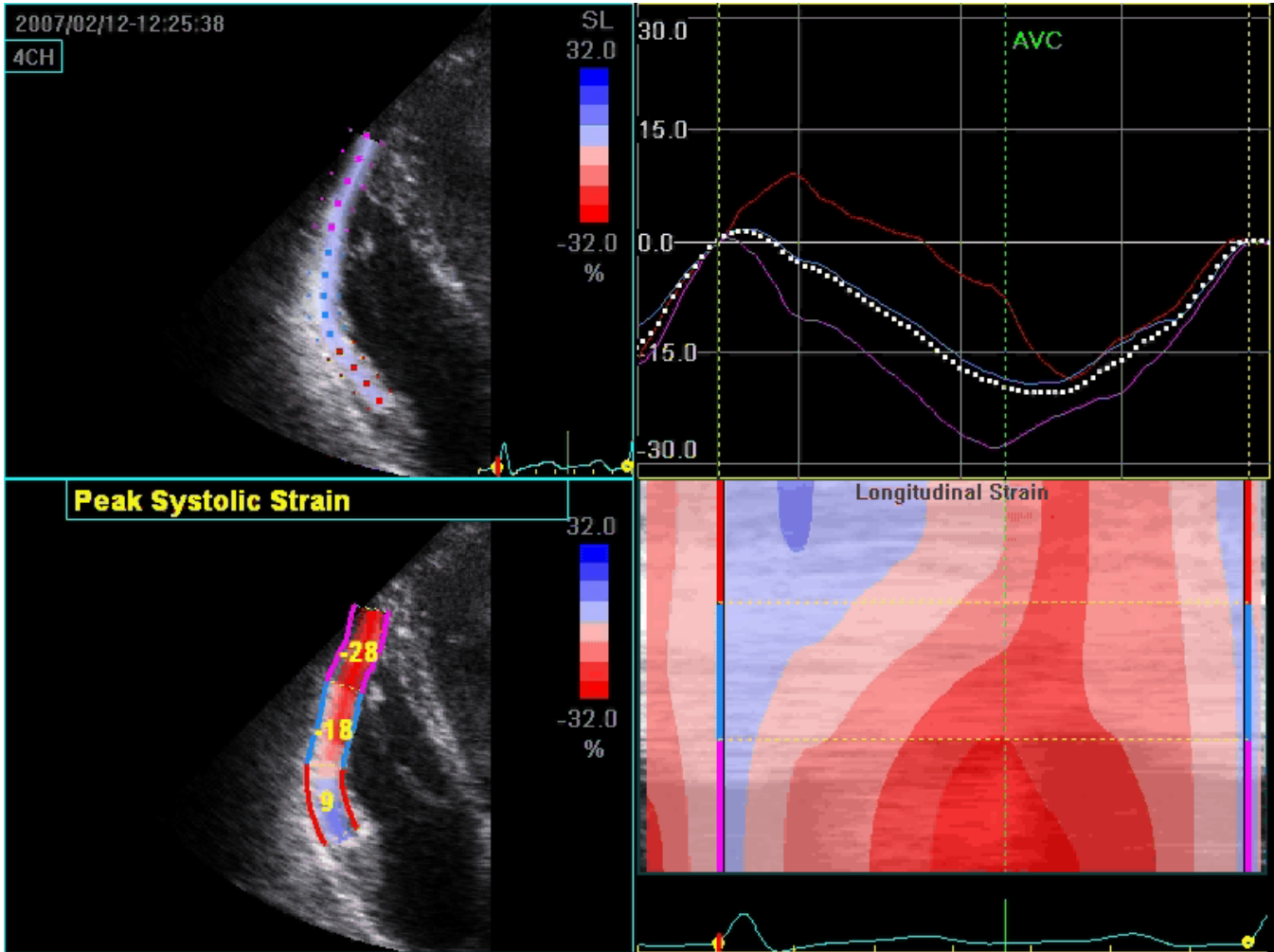
HEART
MUSCLE

FATTY
TISSUE

FATTY
TISSUE







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