



ESDA

European Society of Dirofilariosis and Angiostrongylosis

Echocardiographic Findings in Canine HW Disease

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Pathogenesis



- Chronic disease
- Damages first at the pulmonary parenchyma and arterial vessels
- Right cardiac chambers dilatation only in the late stage of the disease and when pulmonary parenchymal and arterial diseases are present only

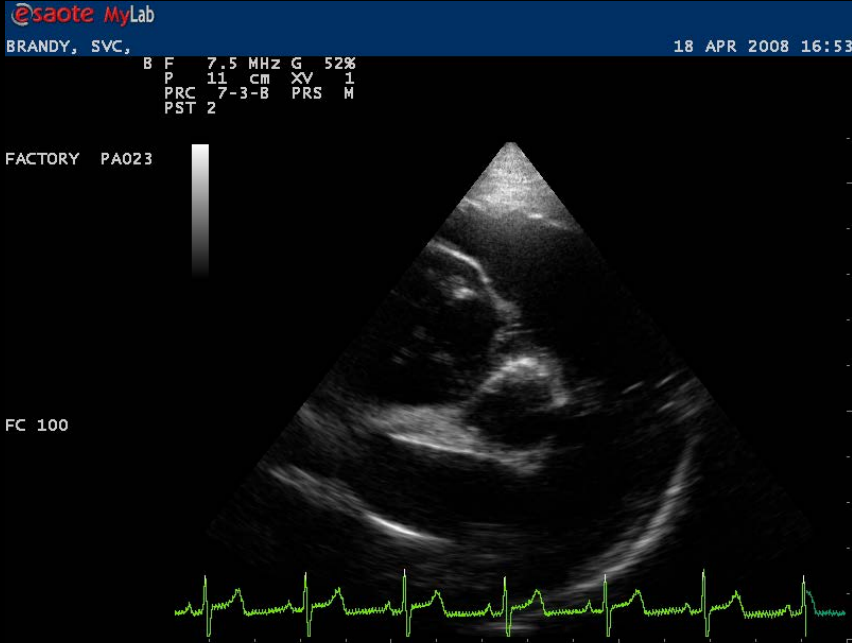
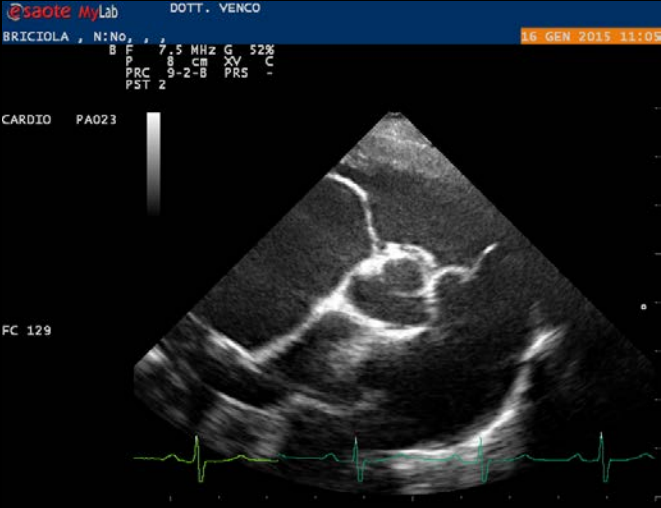
Look for

- Pulmonary hypertension
- HW visualization
- Right cardiac failure

Pulmonary arteries enlargement



Pulmonary hypertension





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Veterinary Parasitology

journal homepage: www.elsevier.com/locate/vetpar



Right Pulmonary Artery Distensibility Index (RPAD Index).
A field study of an echocardiographic method to detect early
development of pulmonary hypertension and its severity
even in the absence of regurgitant jets for Doppler evaluation
in heartworm-infected dogs



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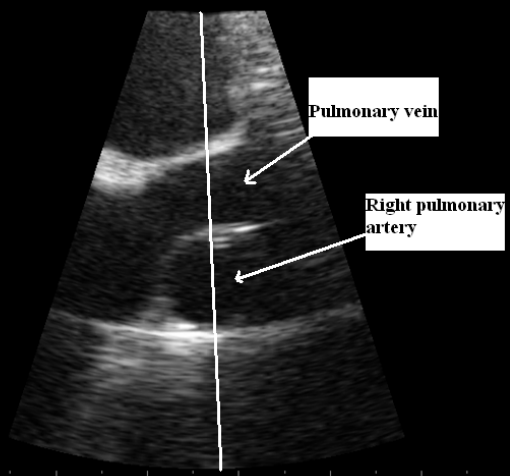
^b *United Veterinary Clinic, Carevec, 9000 Varna, Bulgaria*

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RPAD Index

(**R**ight **P**ulmonary **A**rtery **D**istensibility **I**ndex)

«Systolic diameter less Diastolic diameter, divided by systolic diameter»



CABIRIA,
B F 7.5 MHz G 52%
P 8 cm XV C
PRC 7-3-A PRS M
PST 2

CARDIO 2 PA023

D1	10.5 mm
D2	5.7 mm
D3	10.5 mm
D4	5.7 mm
D5	10.5 mm
D6	5.7 mm



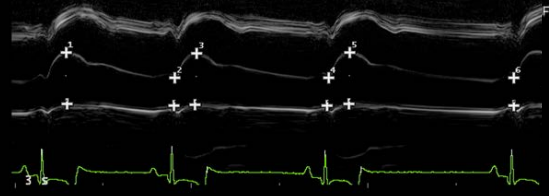
16 MAG 2013 16:3 RAPHAEL,
M G 52%
PRC 7-3
PST 2

CARDIO 2 PA121

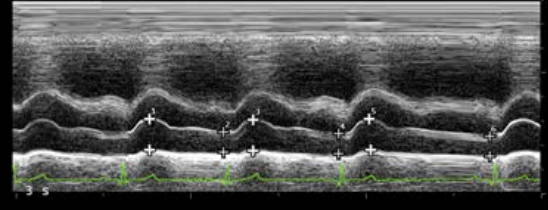
D1	12.8 mm
D2	8.3 mm
D3	12.8 mm
D4	8.3 mm
D5	12.8 mm
D6	8.3 mm



FC 79



FC 87



BOBBY,
B F 5.0 MHz G 52%
P 10 cm XV 1
PRC 7-3-A PRS M
PST 2

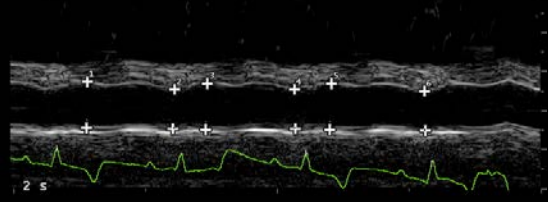
25 FEB 2013 11:41
M G 52%
PRC 7-3
PST 2

FACTORY PA121

D1	11.9 mm
D2	10.1 mm
D3	11.9 mm
D4	10.1 mm
D5	11.9 mm
D6	10.1 mm



FC 127



RPAD Index

(Right Pulmonary Artery Distensibility Index)

«Systolic diameter less Diastolic diameter, divided by systolic diameter»

A value **lower than 35%** is indicative of pulmonary hypertension

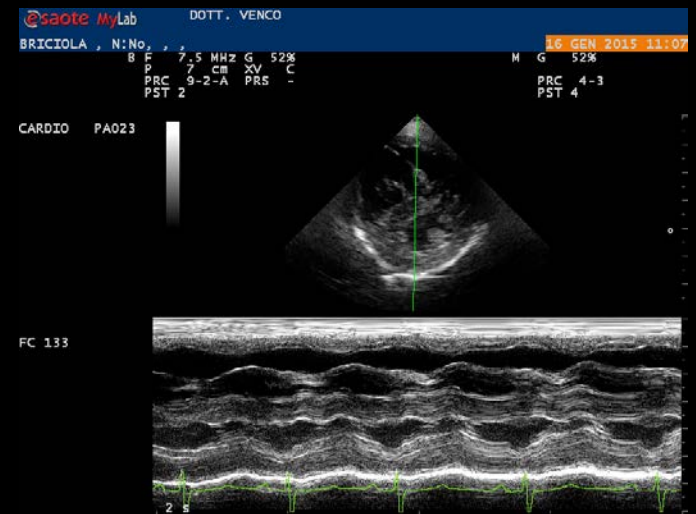
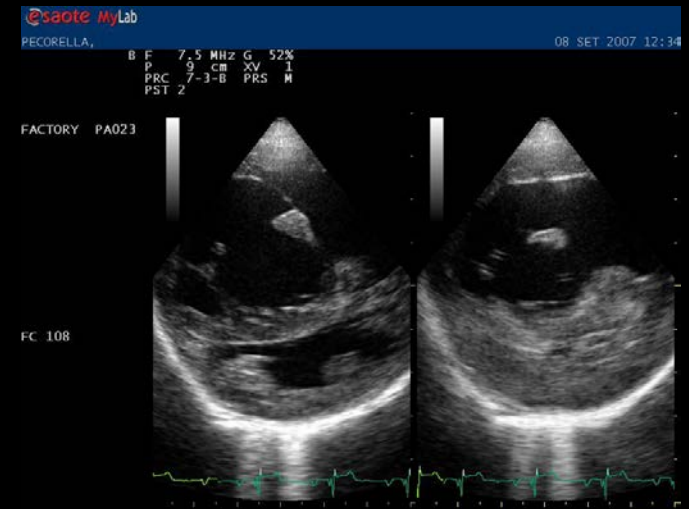
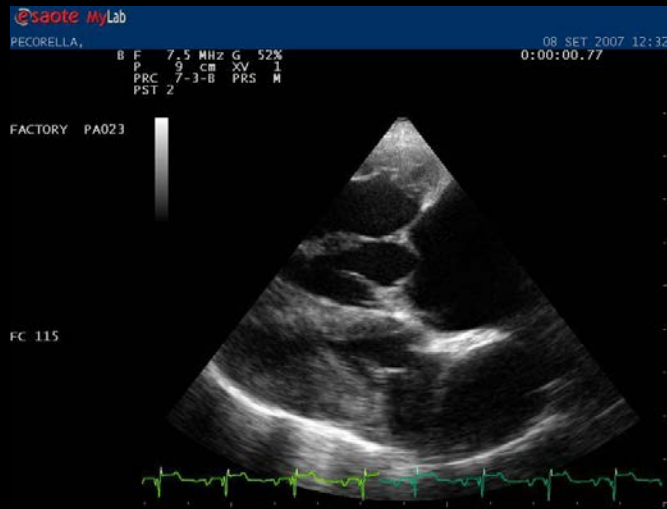
Between **35 % to 28 %** is correlated to mild systolic pulmonary hypertension (30- 55 mm Hg),
to moderate pulmonary hypertension (56-79 mm Hg) if in between **27 % to 23 %**

and to severe pulmonary hypertension (> 79 mm Hg)

Pulmonary hypertension

Right cardiac chambers enlargement

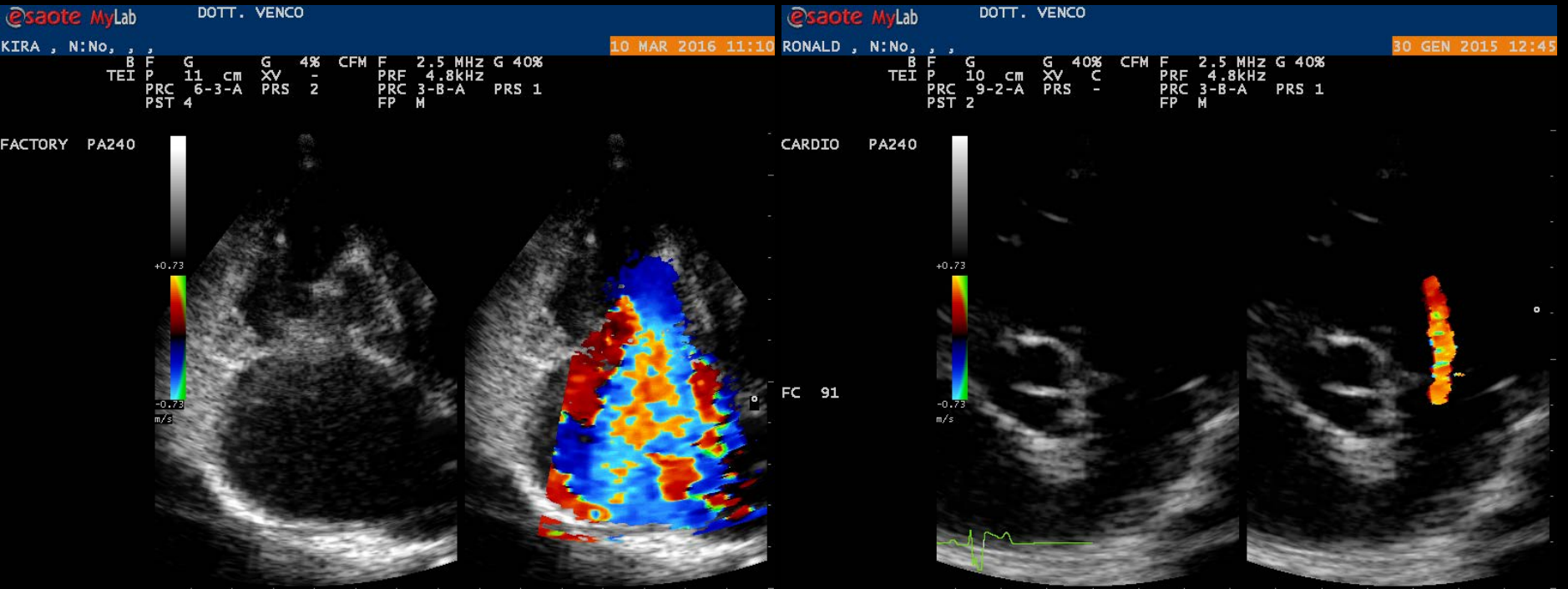
Paradoxical septal motion



Doppler echocardiography (CFM)



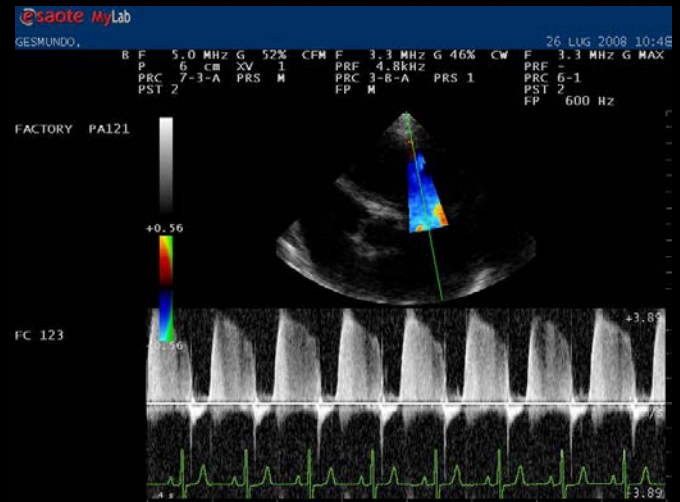
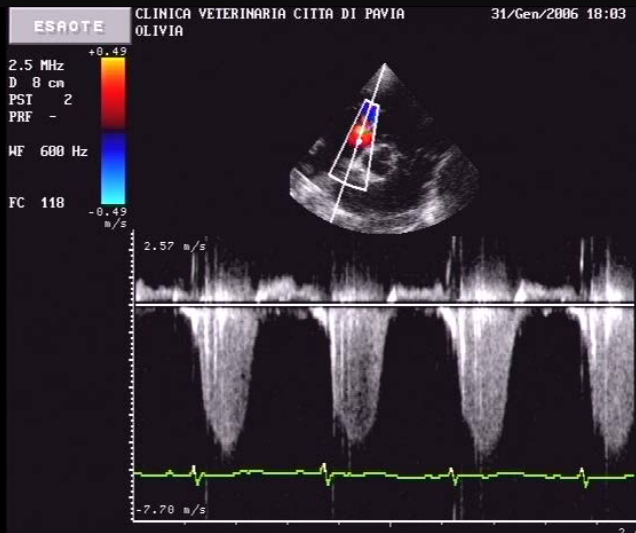
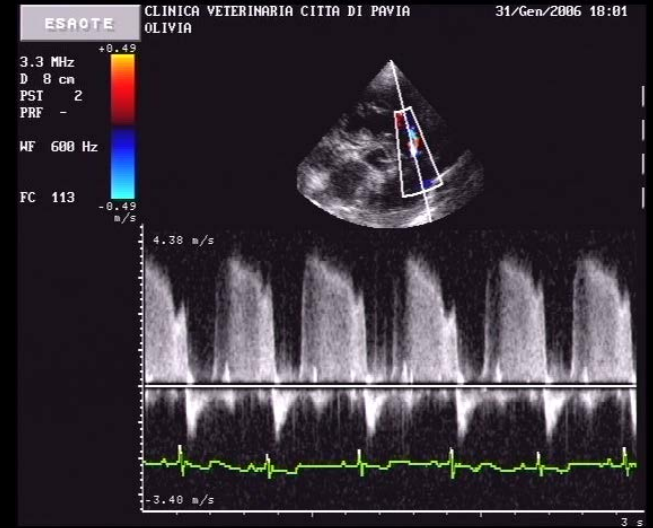
Tricuspidal/Pulmonary regurgitation



Doppler echocardiography (CW)

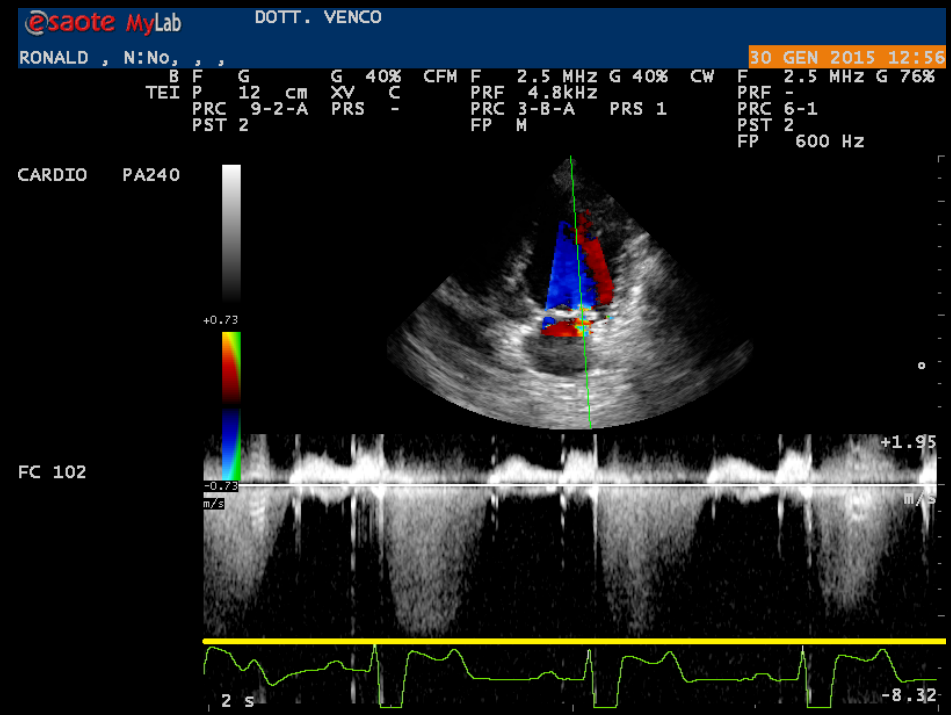
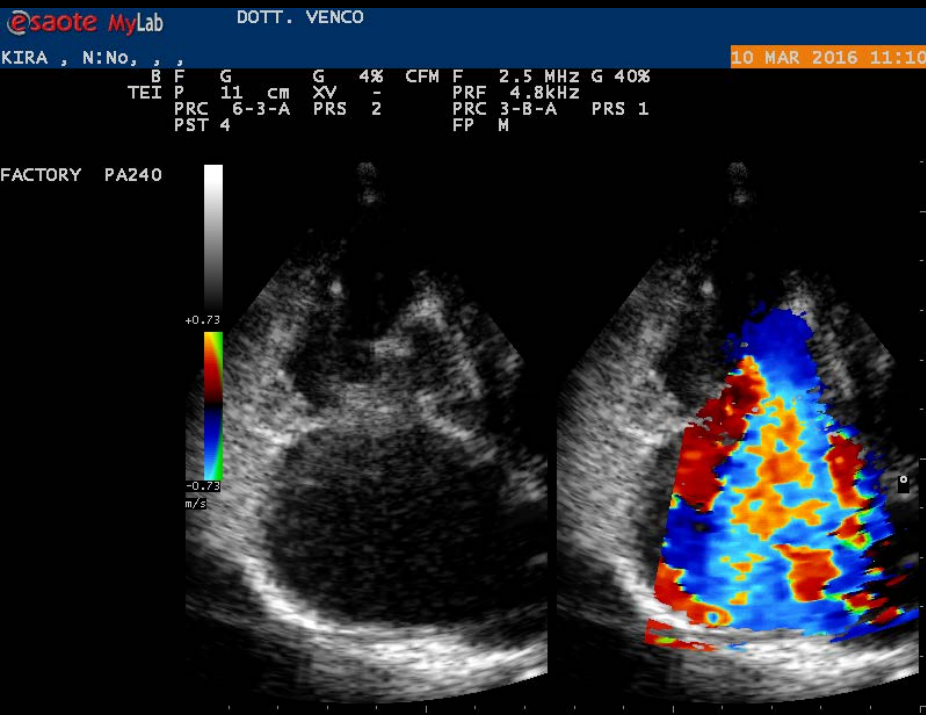


Pulmonary pressure



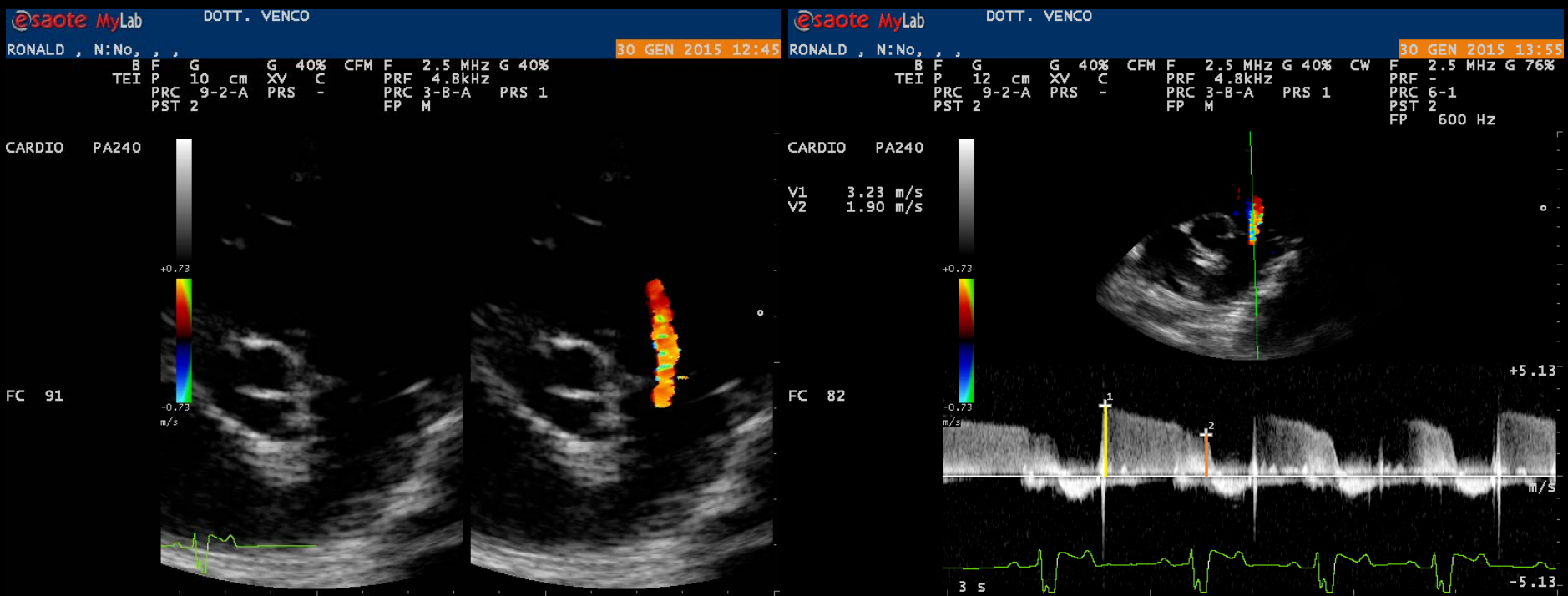
Tricuspid systolic regurgitation

Assessment of pulmonary artery systolic pressure (PASP) can be carried out by measuring maximal tricuspid regurgitation velocity, and applying the modified Bernoulli equation to convert this value into pressure values. Estimated right atrial pressure (RAP) must be added to this obtained value



Pulmonary diastolic regurgitation

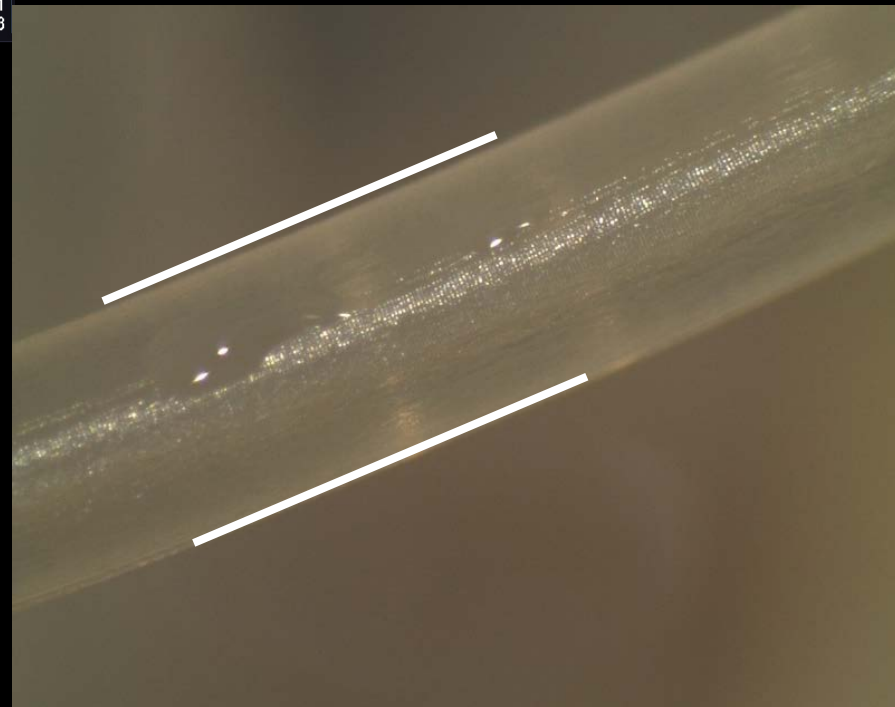
Mean (PAMP) and diastolic PA-pressures (PADP) can be estimated by assessment of the pulmonary regurgitation.



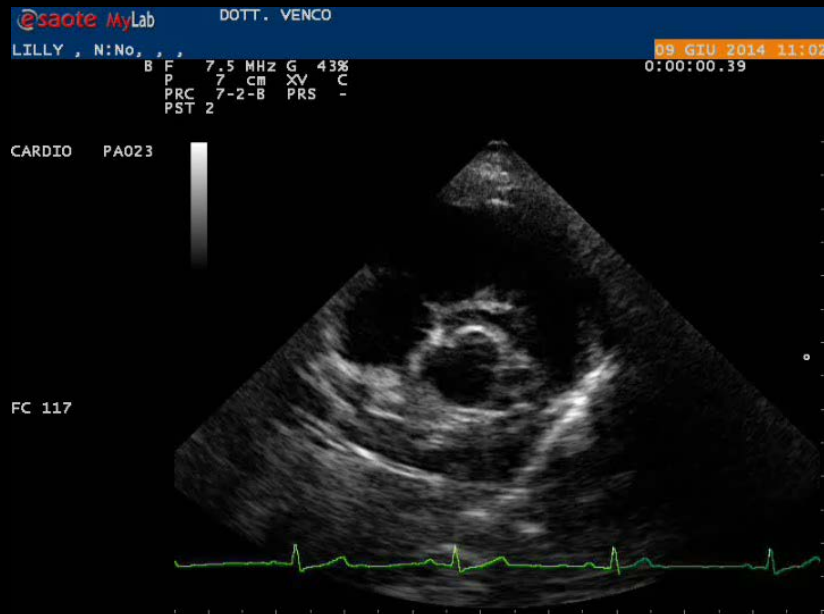
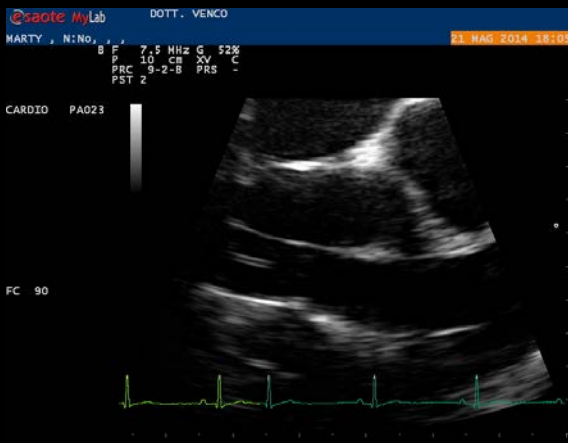
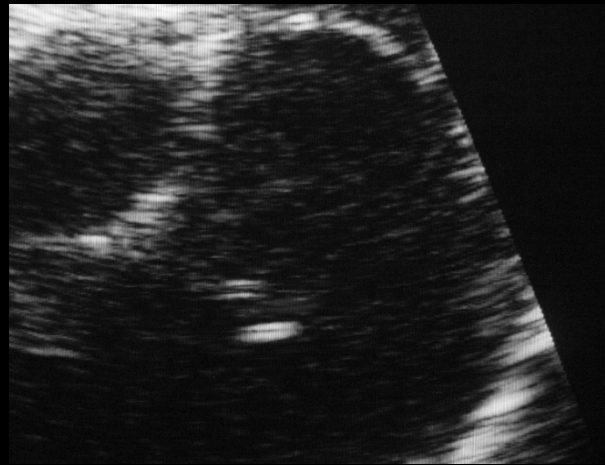
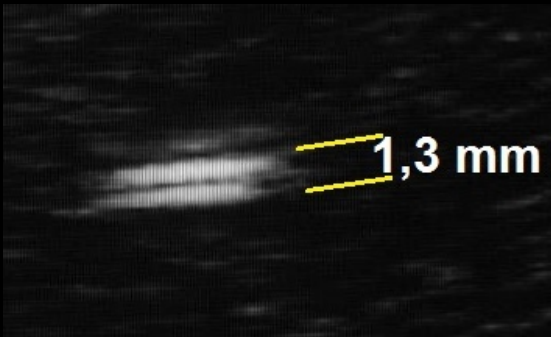
HW visualization



The heartworms are visualized as double, linear parallel objects (diameter 1,3 mm) floating into the lumen of pulmonary arteries or into the right cardiac chambers (n case of Caval syndrome)



HW visualization



HW visualization

@saote MyLab

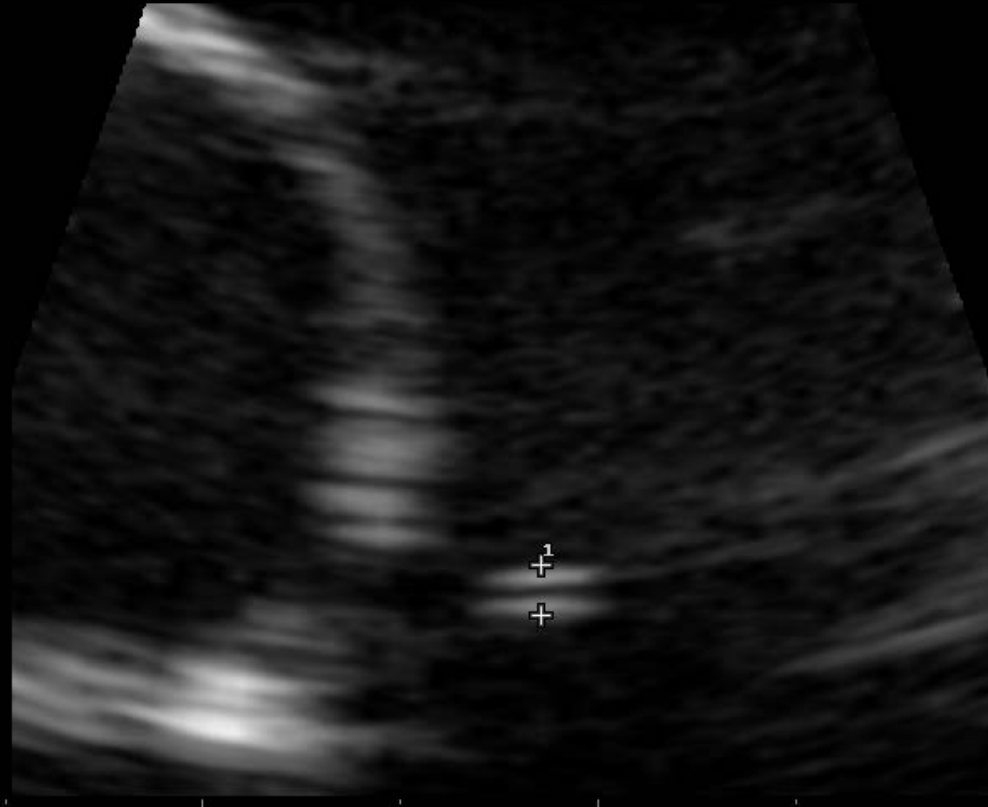
OLIVIA,

30 GIU 2014 12:53

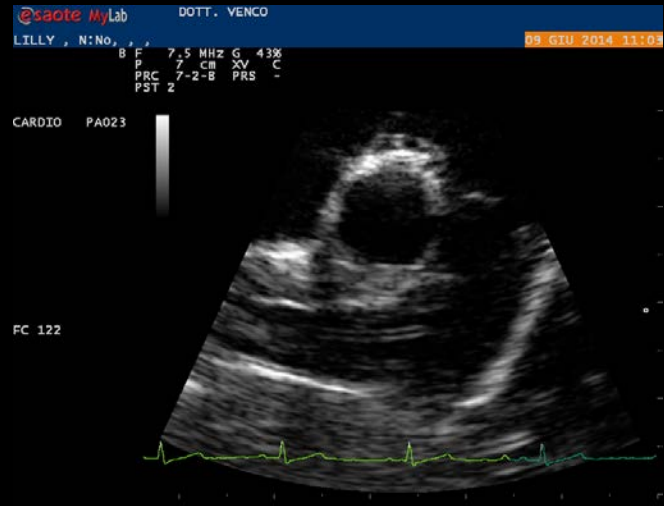
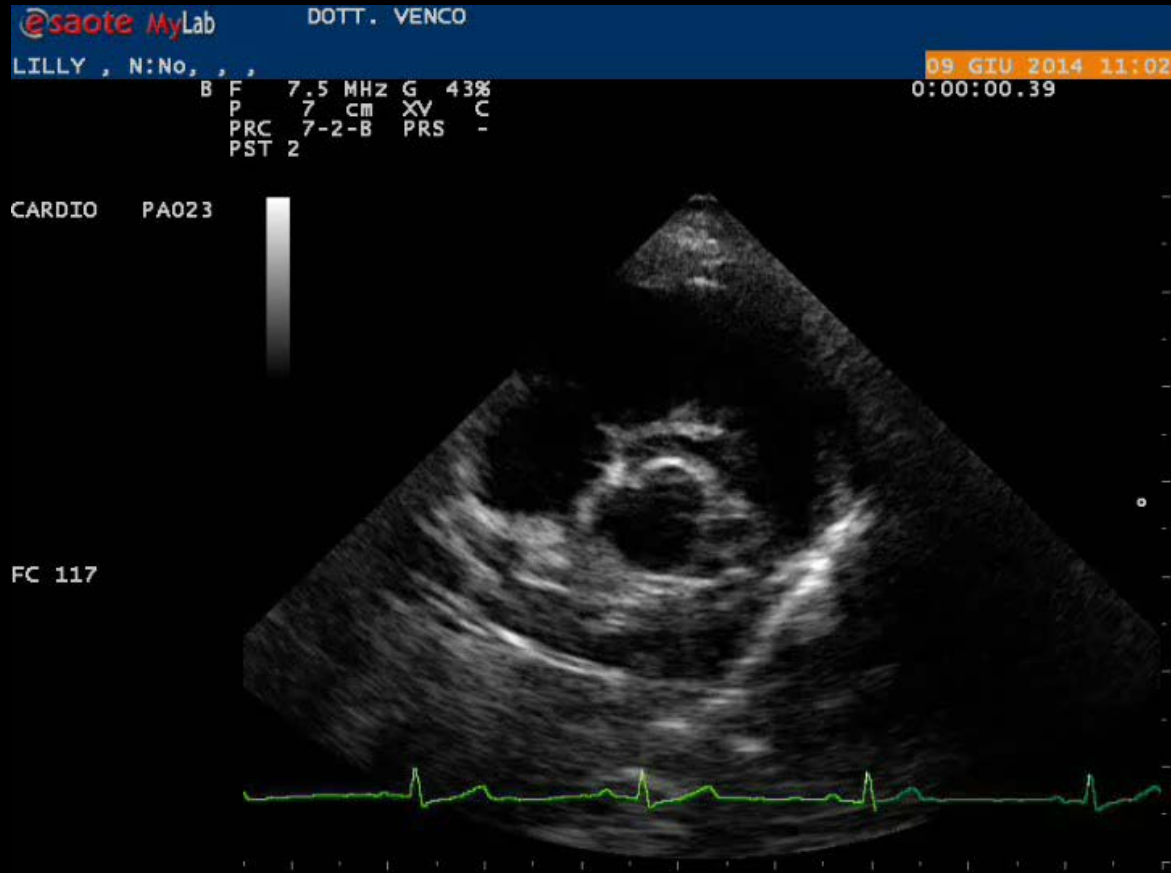
B F 7.5 MHz G 52%
P 6 cm XV C
PRC 6-3-B PRS M
PST 2

CARDIO 2 PA023

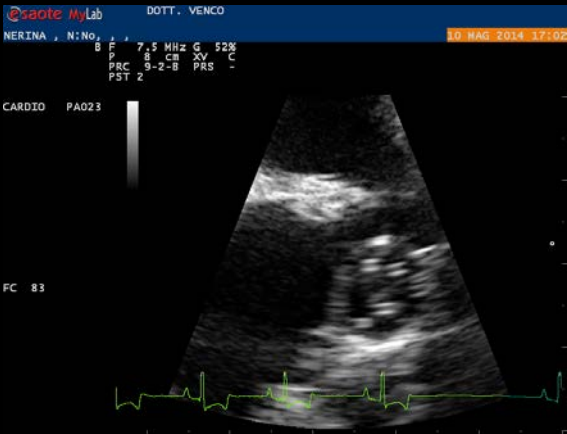
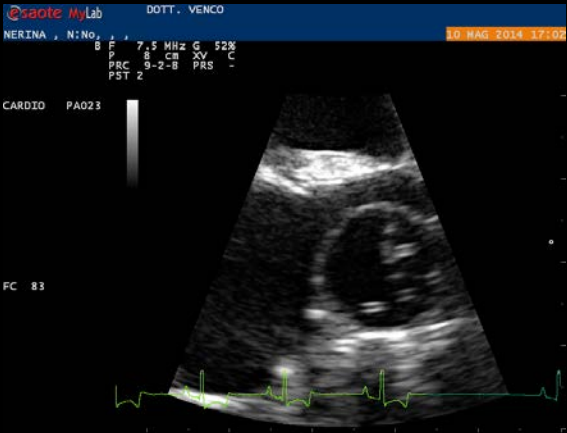
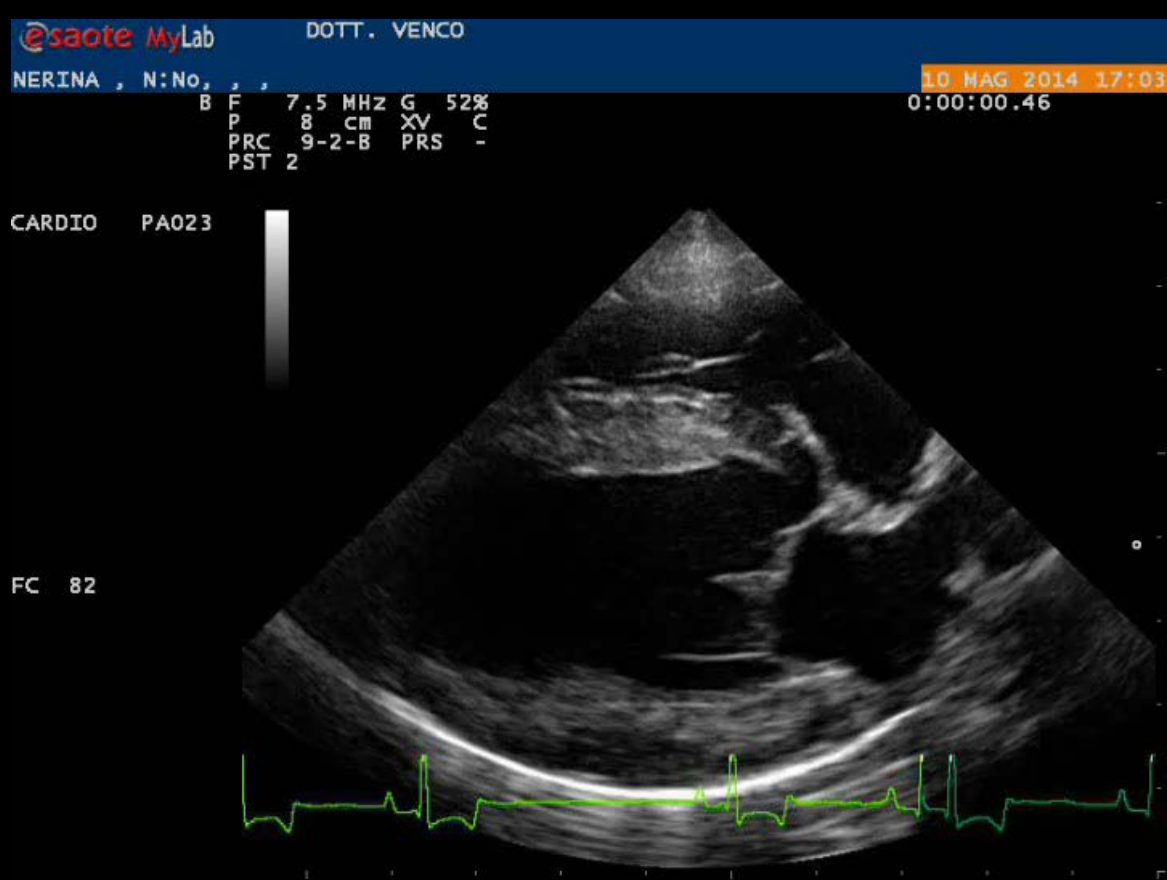
D1 1.3 mm



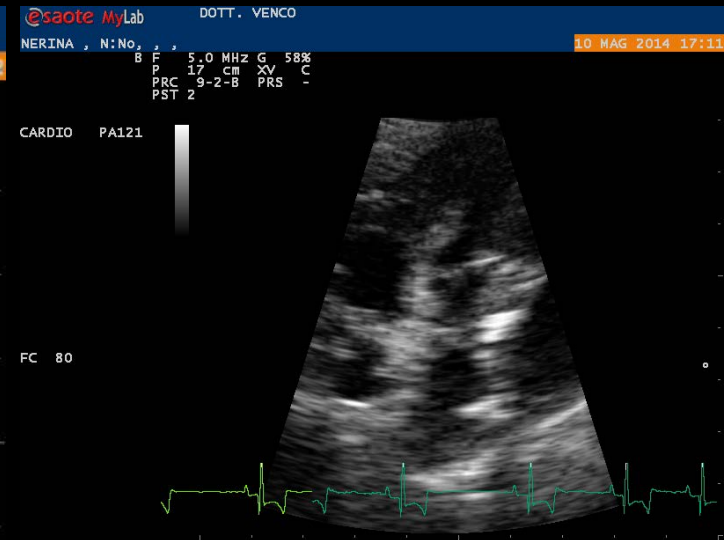
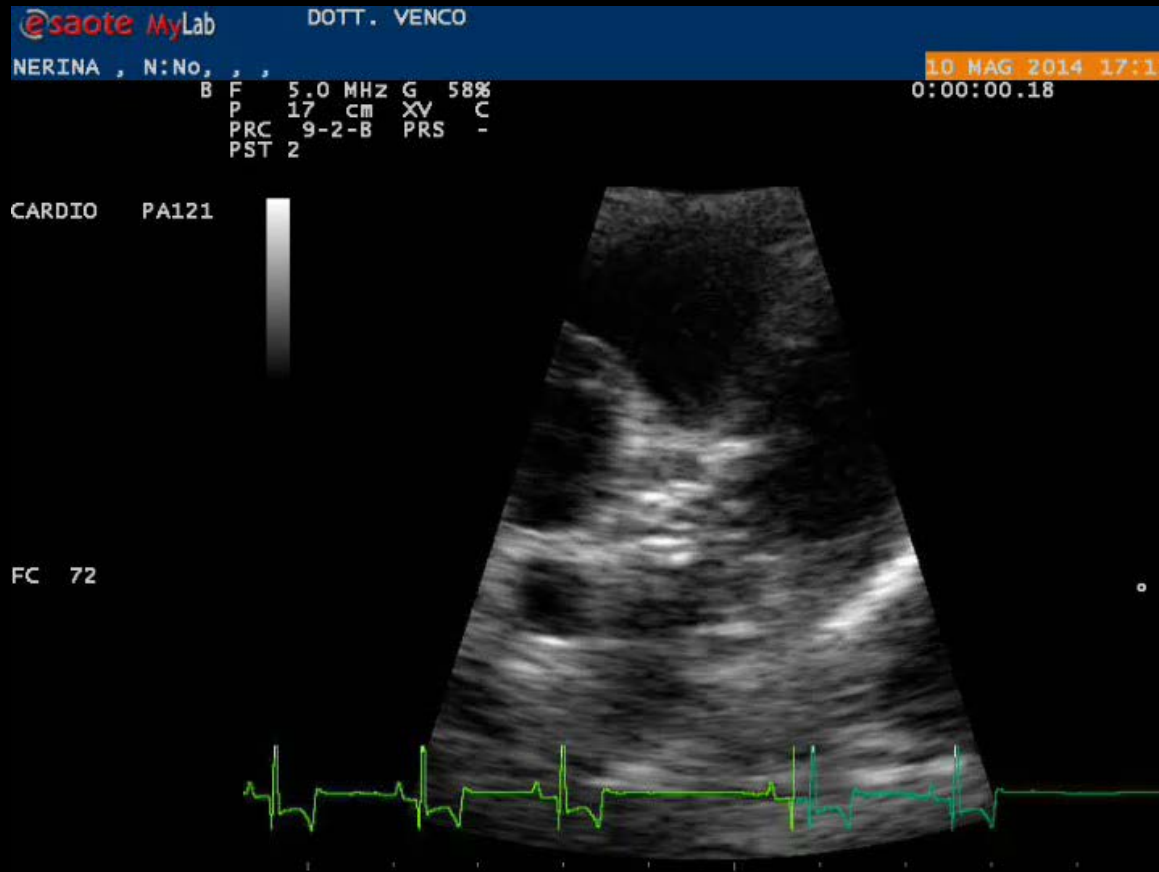
HW visualization views (right side)



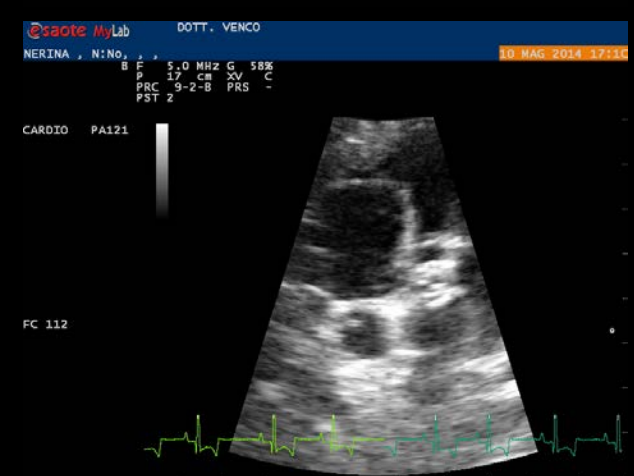
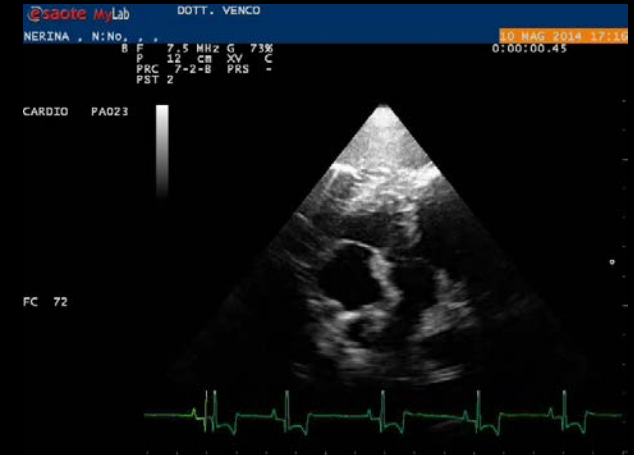
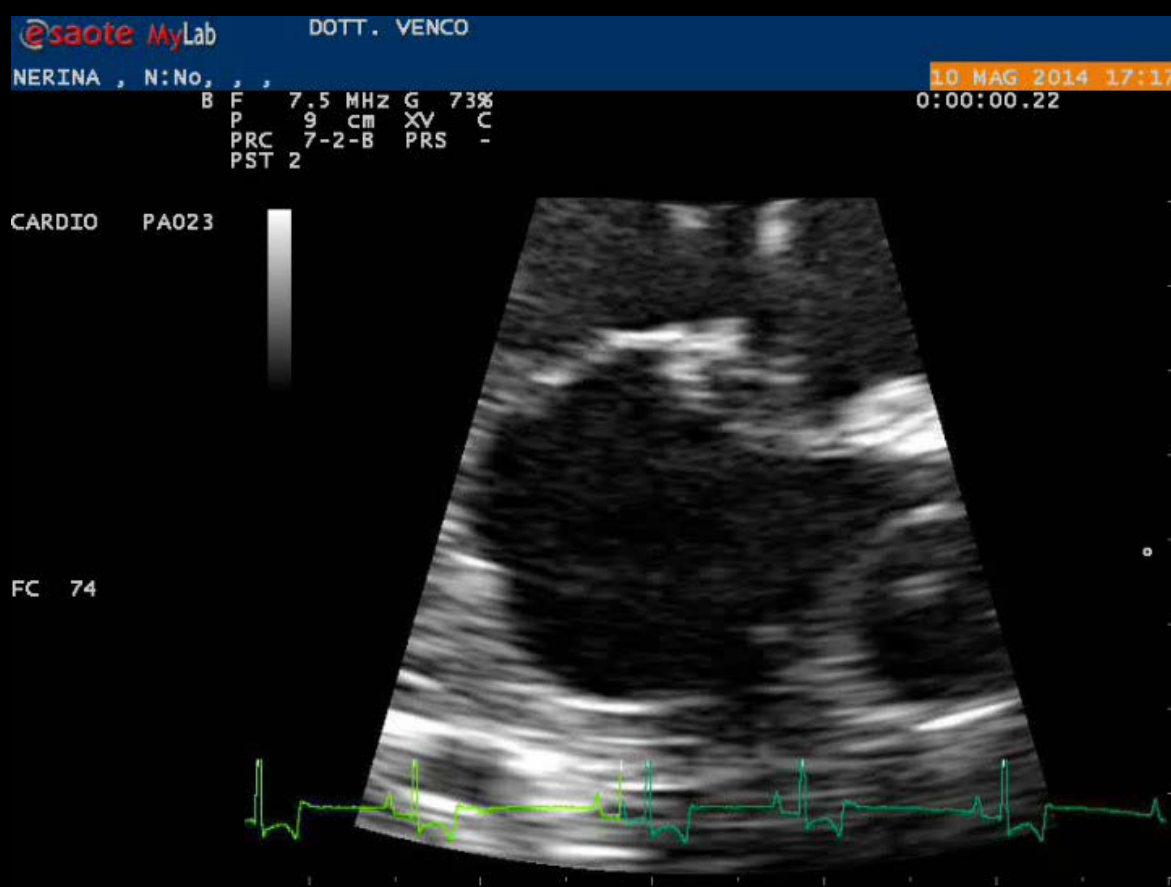
HW visualization views (right side)



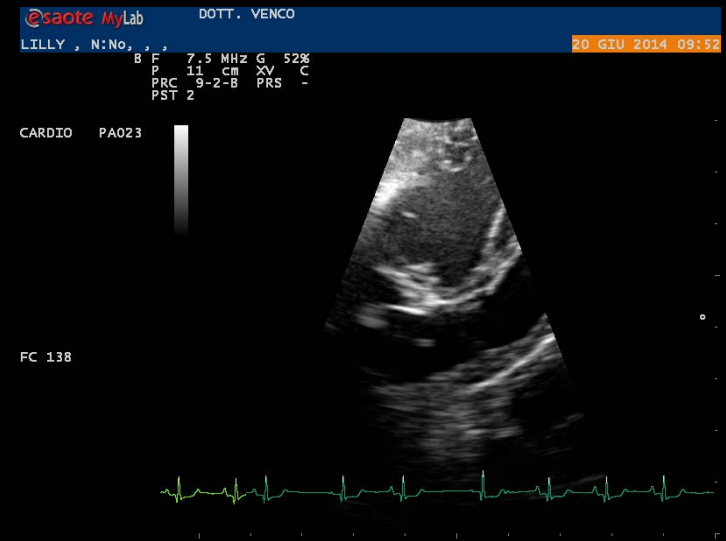
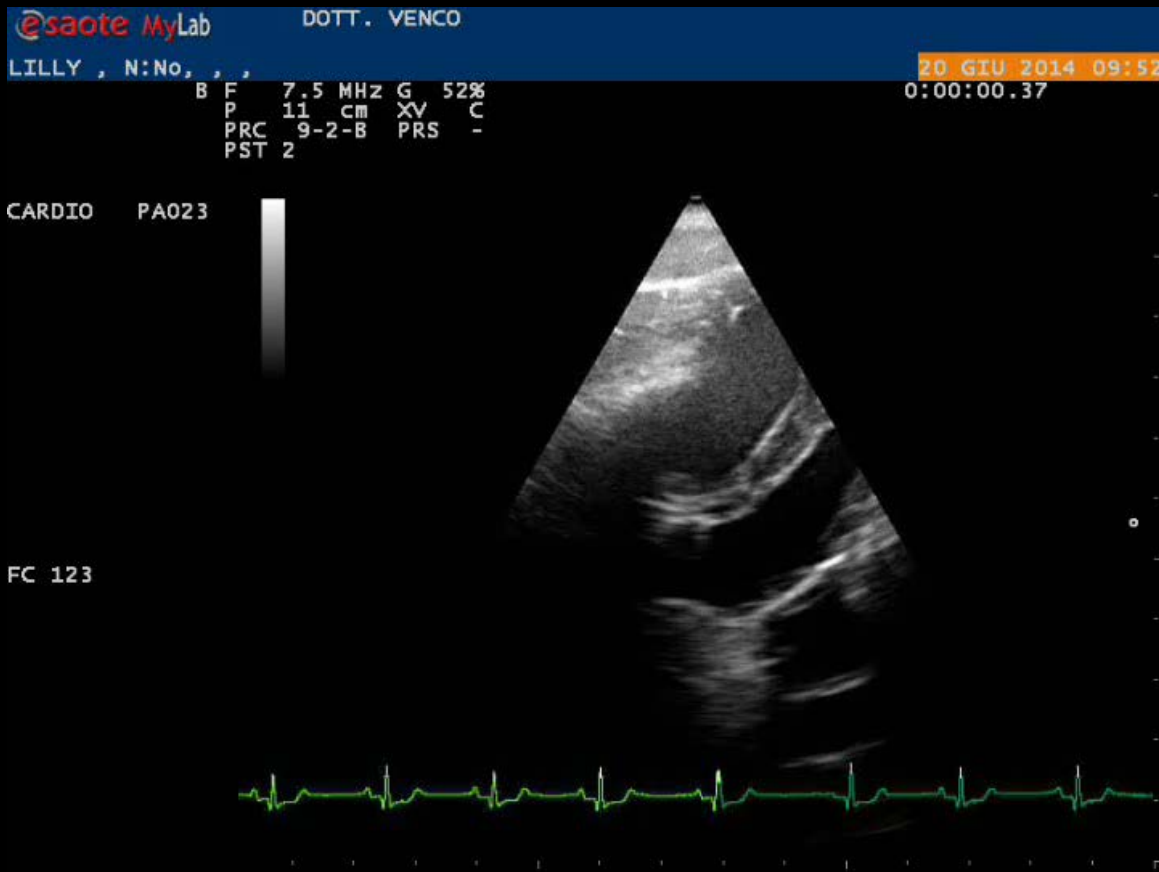
HW visualization views (subxifoidea)



HW visualization views (subxifoidea)



HW visualization views (subxifoidea)



HW visualization views (left side)

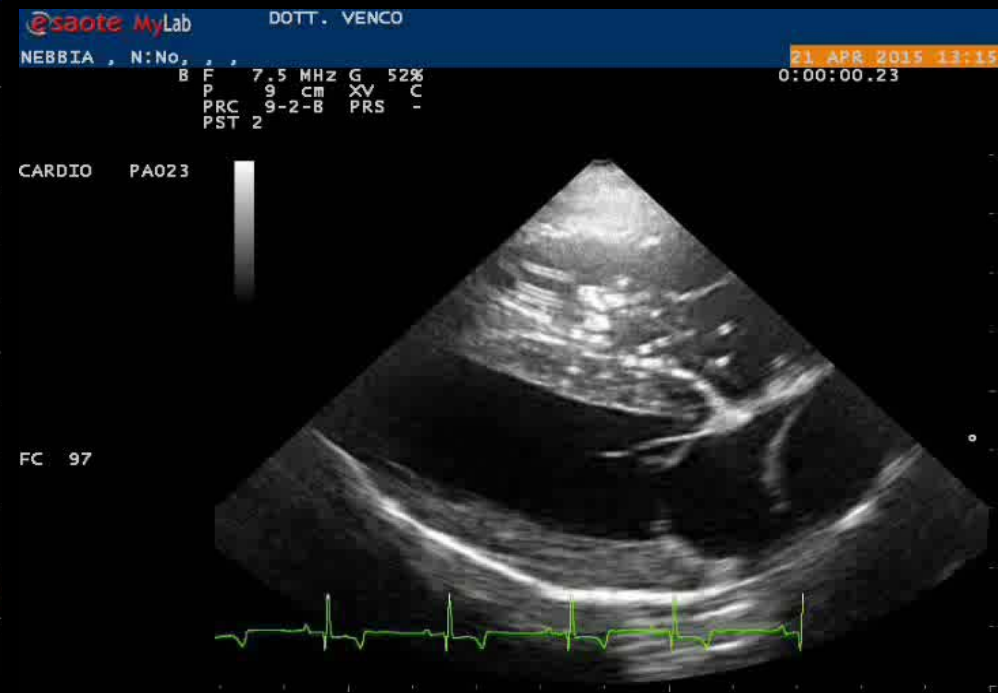
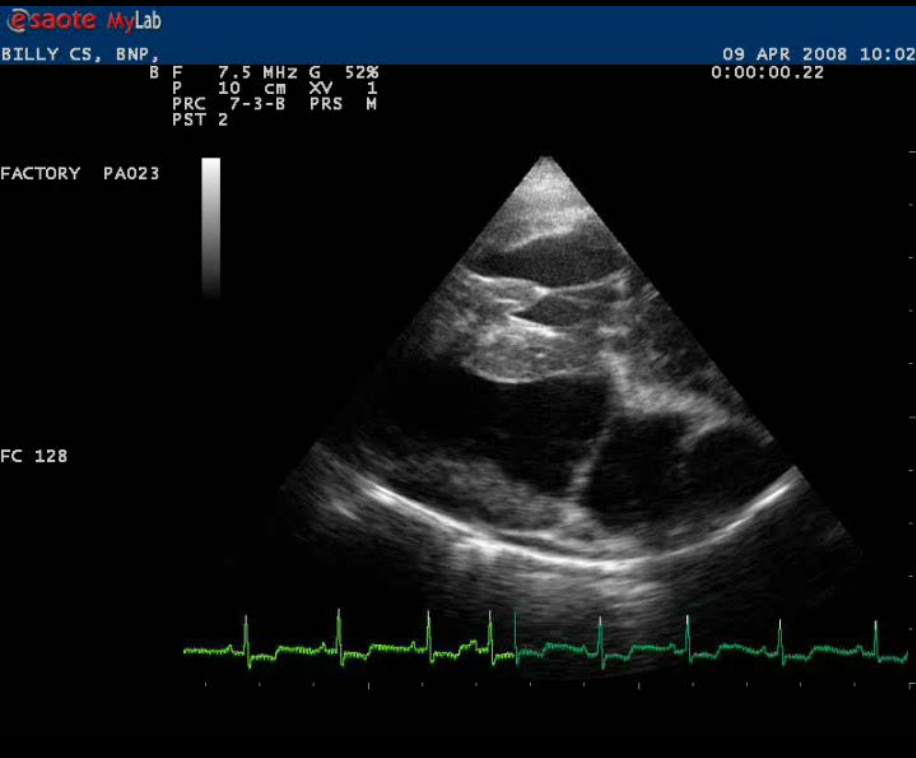


HW visualization views (left side)



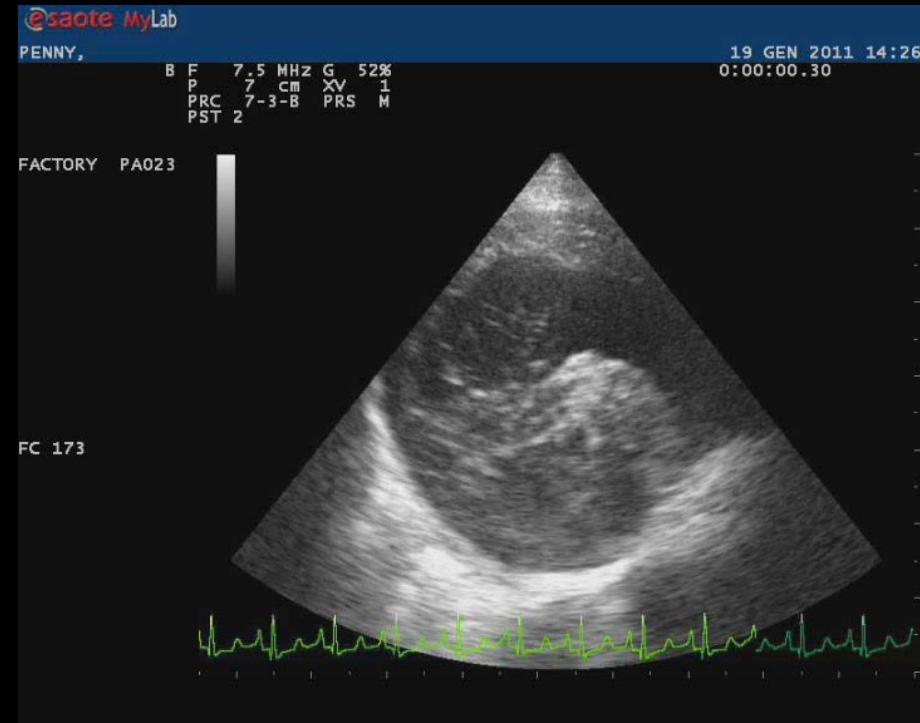
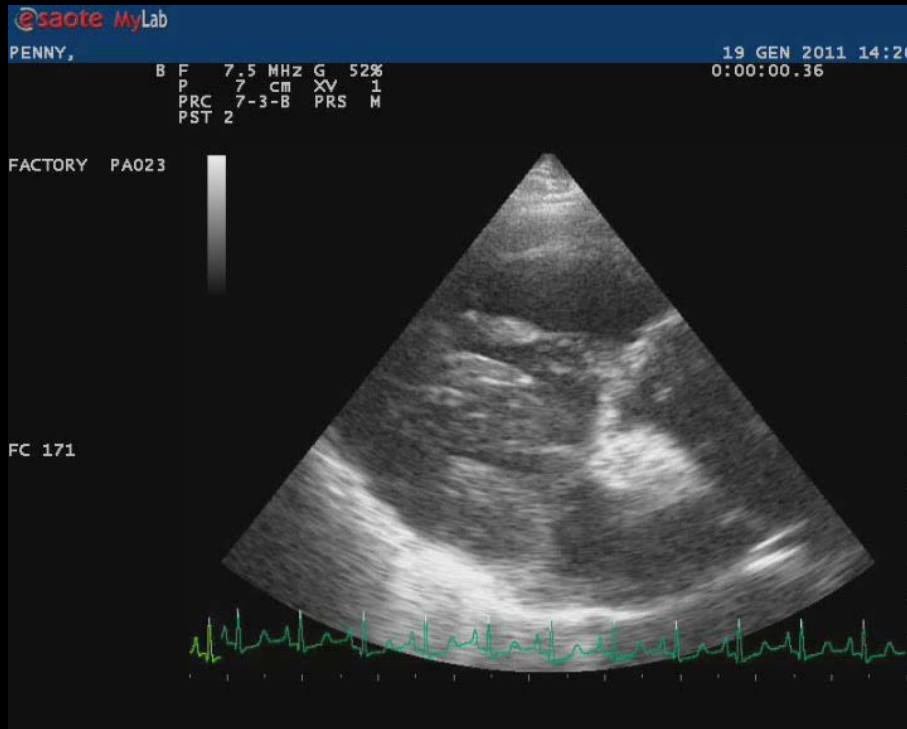
Caval Syndrome

due to a sudden rise in pulmonary pressure and the subsequent displacement of worms from the pulmonary artery into the right cardiac chambers



Caval Syndrome

due to a sudden rise in pulmonary pressure and the subsequent displacement of worms from the pulmonary artery into the right cardiac chambers





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