TURIN,
October
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2018
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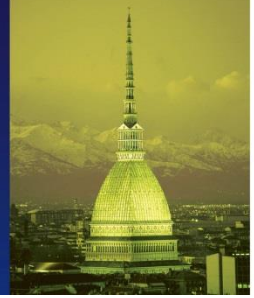


UNIVERSITÁ DEGLI STUDI DI TORINO

AZIENDA OSPEDALIERO - UNIVERSITARIA
Città della Salute e della Scienza di Torino

ECHOCARDIOGRAPHY AND CARDIAC MAGNETIC RESONANCE: BENEFITS, LIMITS AND ADDED VALUE IN DIFFERENT CLINICAL SETTING

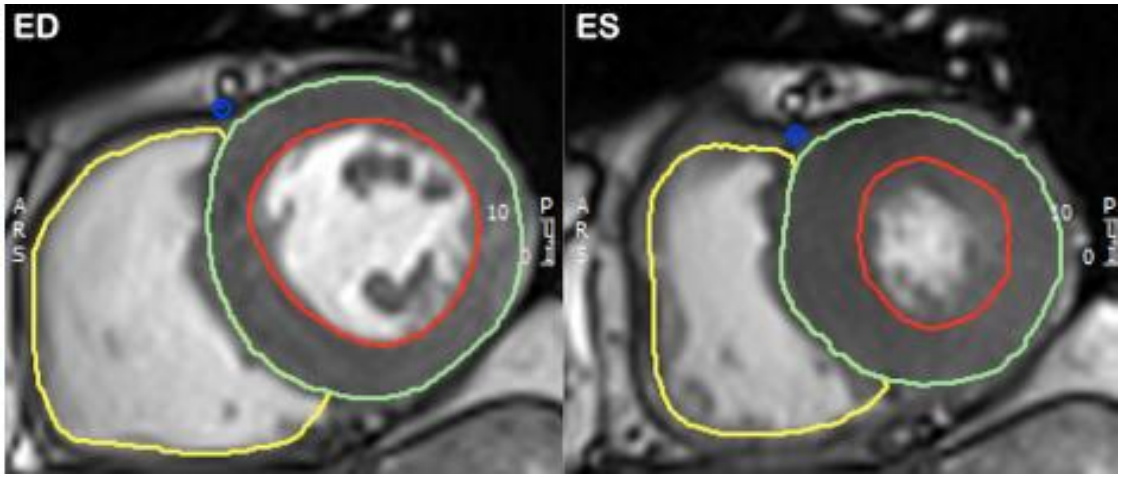
- Valvular Heart Disease -

Walter Grosso Marra

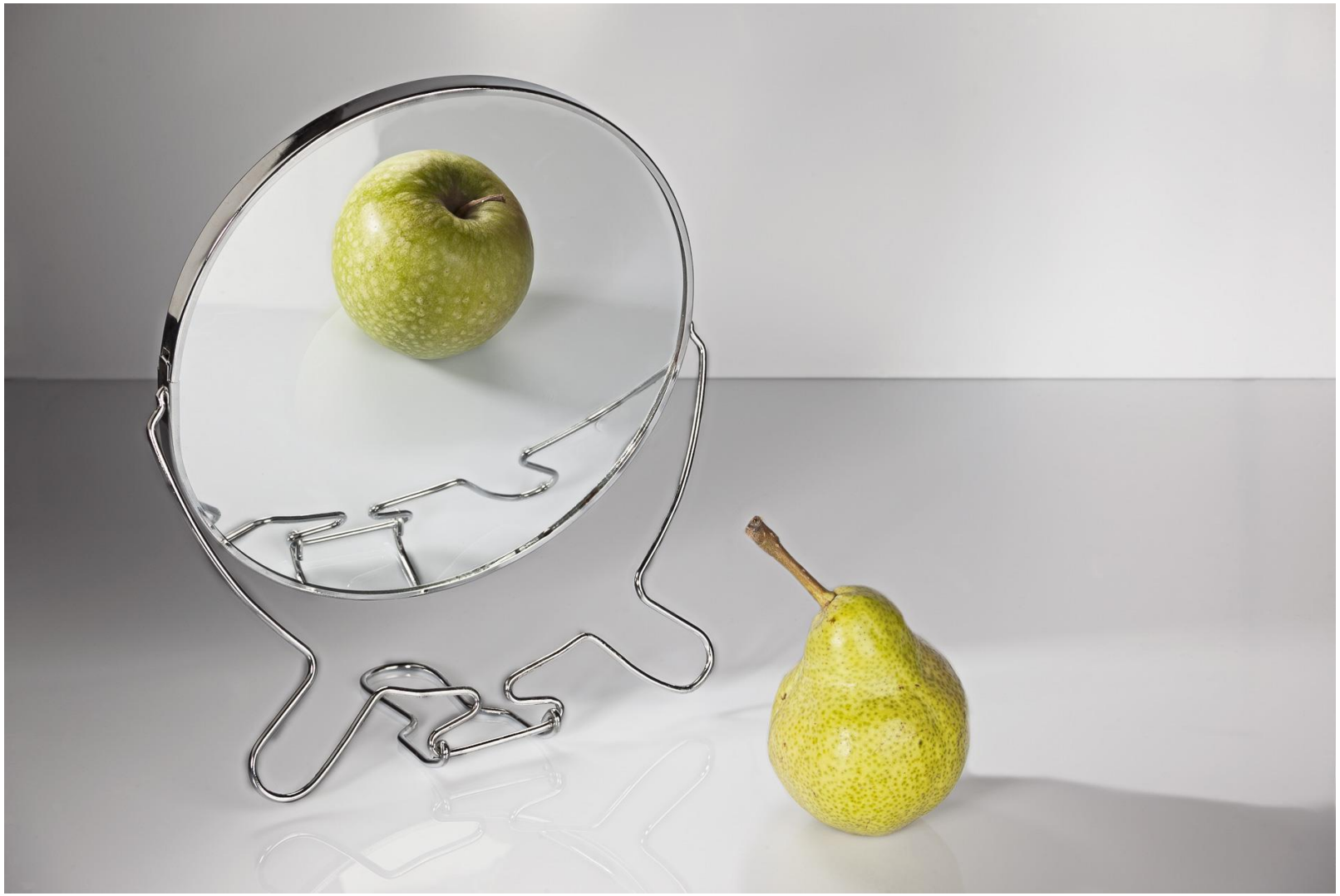
Cardiologia U

Area critica

Città della Salute e della Scienza di Torino

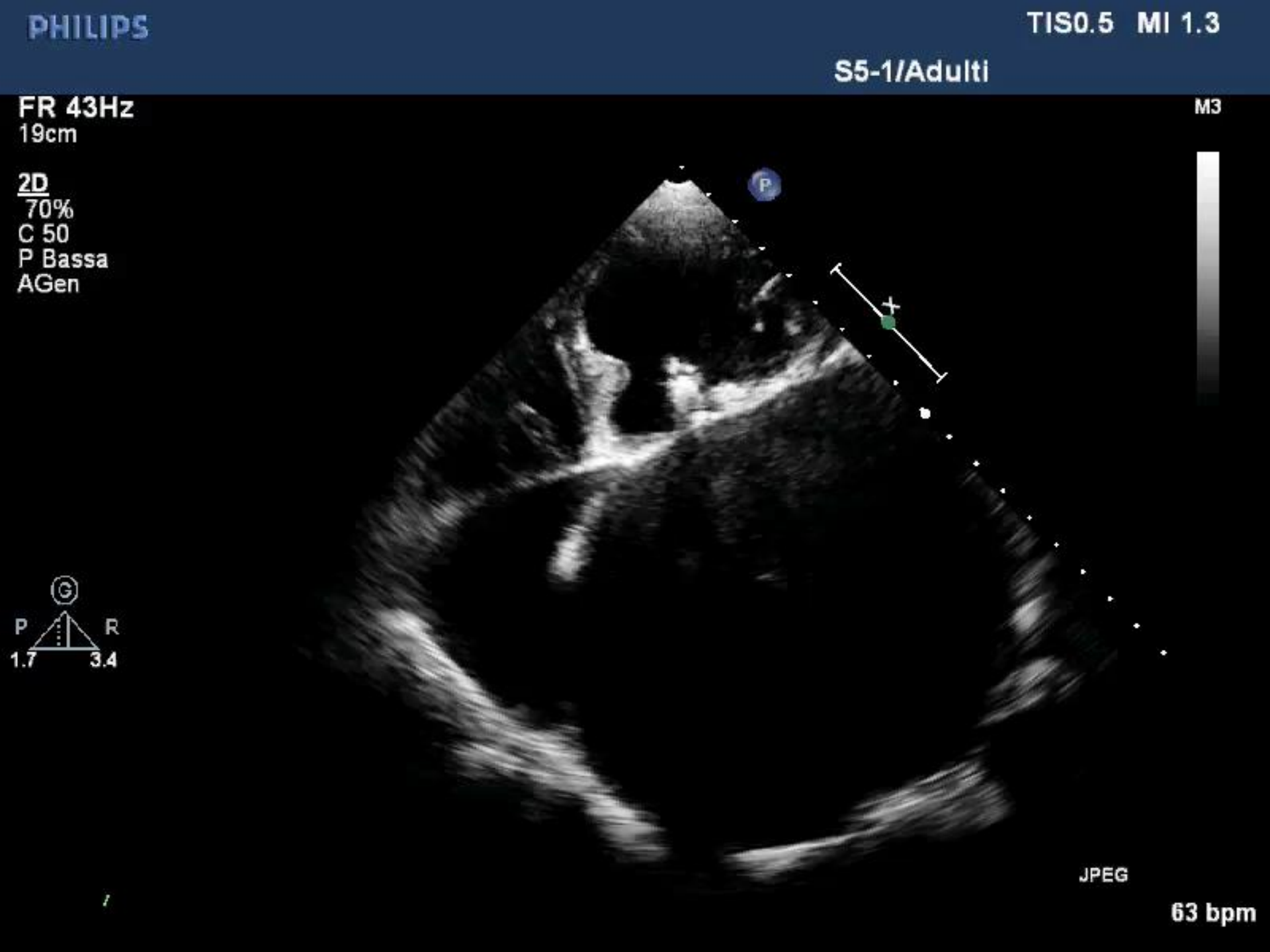


RMN versus ECHO



NON E’ MAI COME SEMBRA ……


GE Healthcare
Vscan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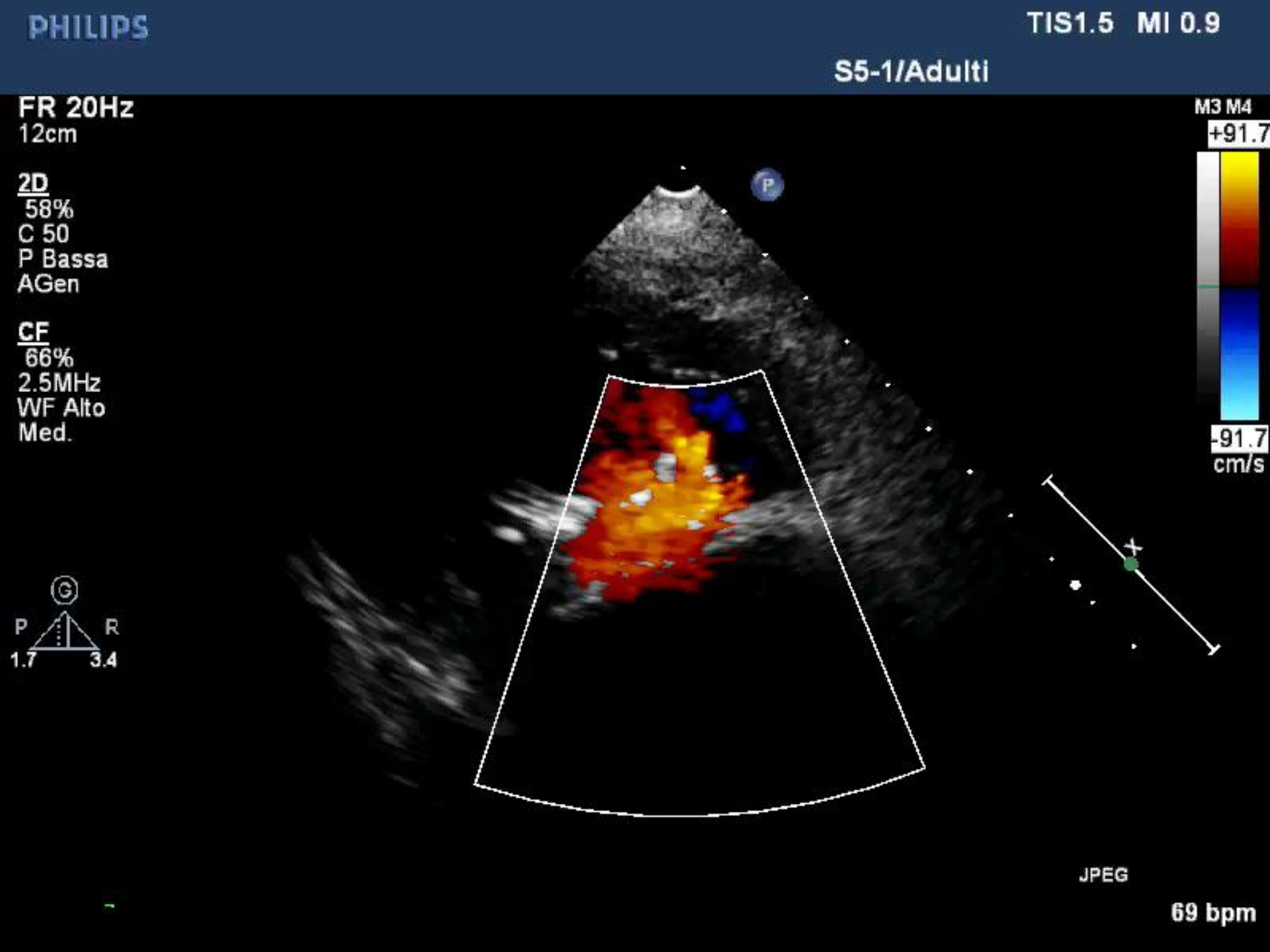
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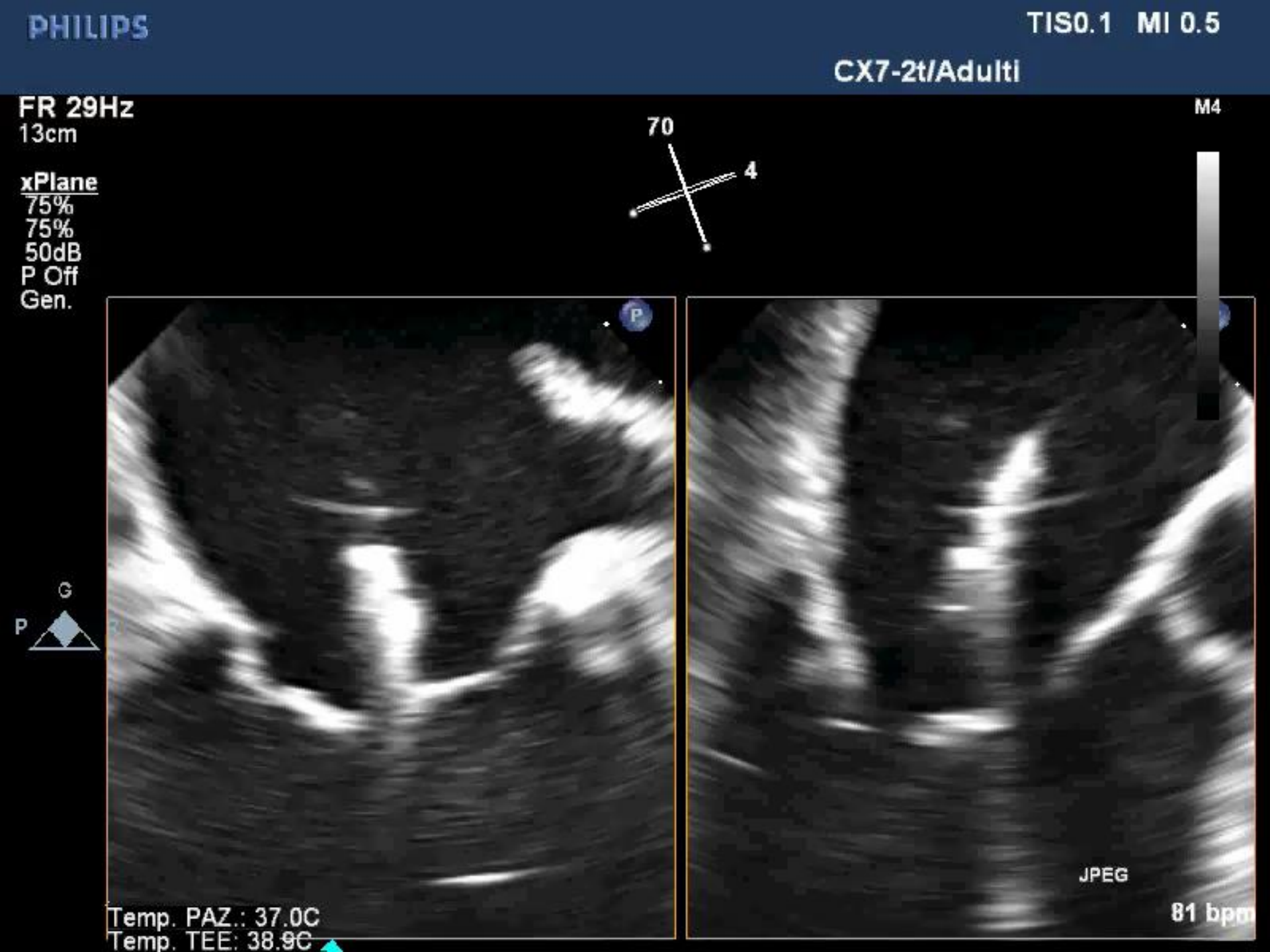
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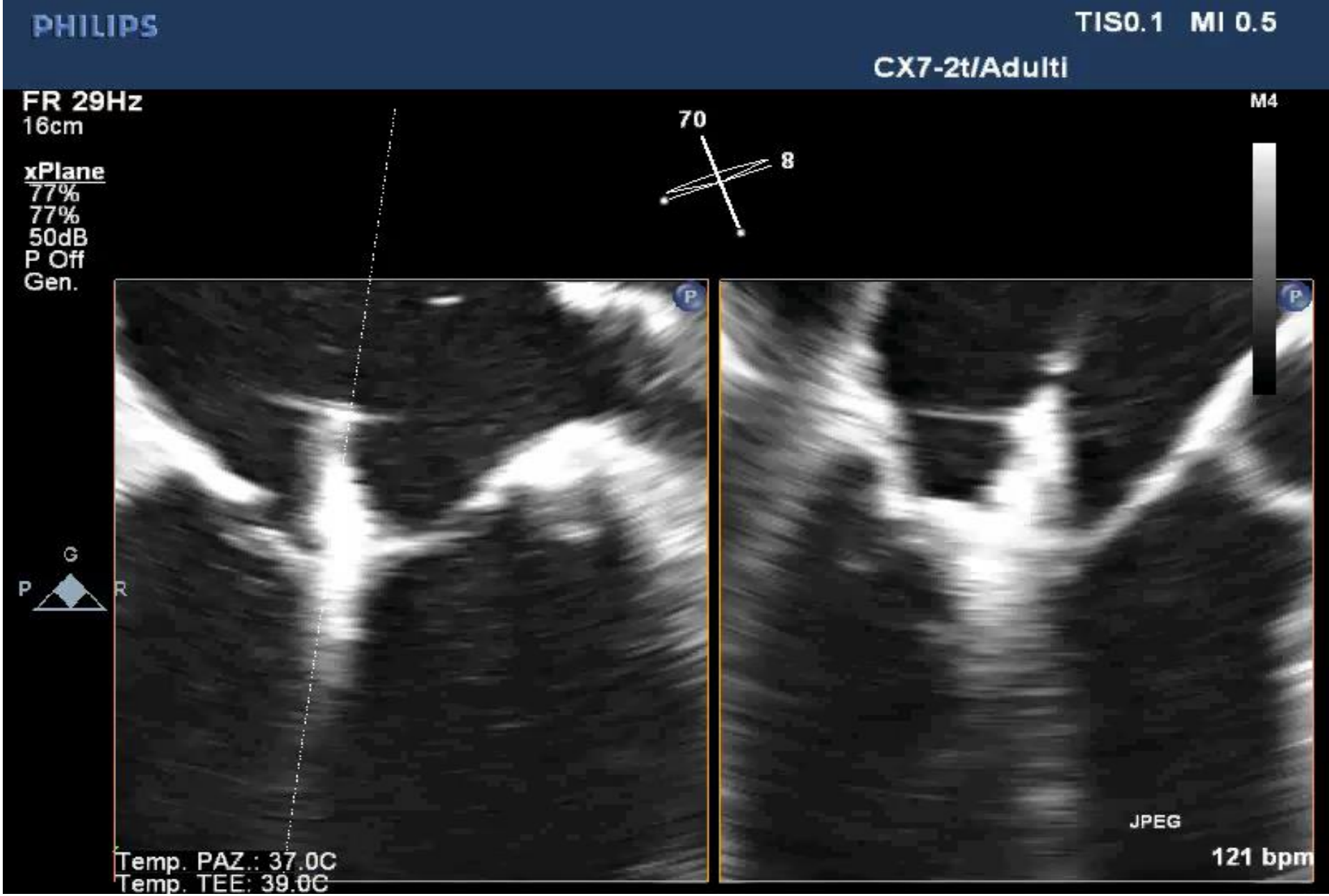
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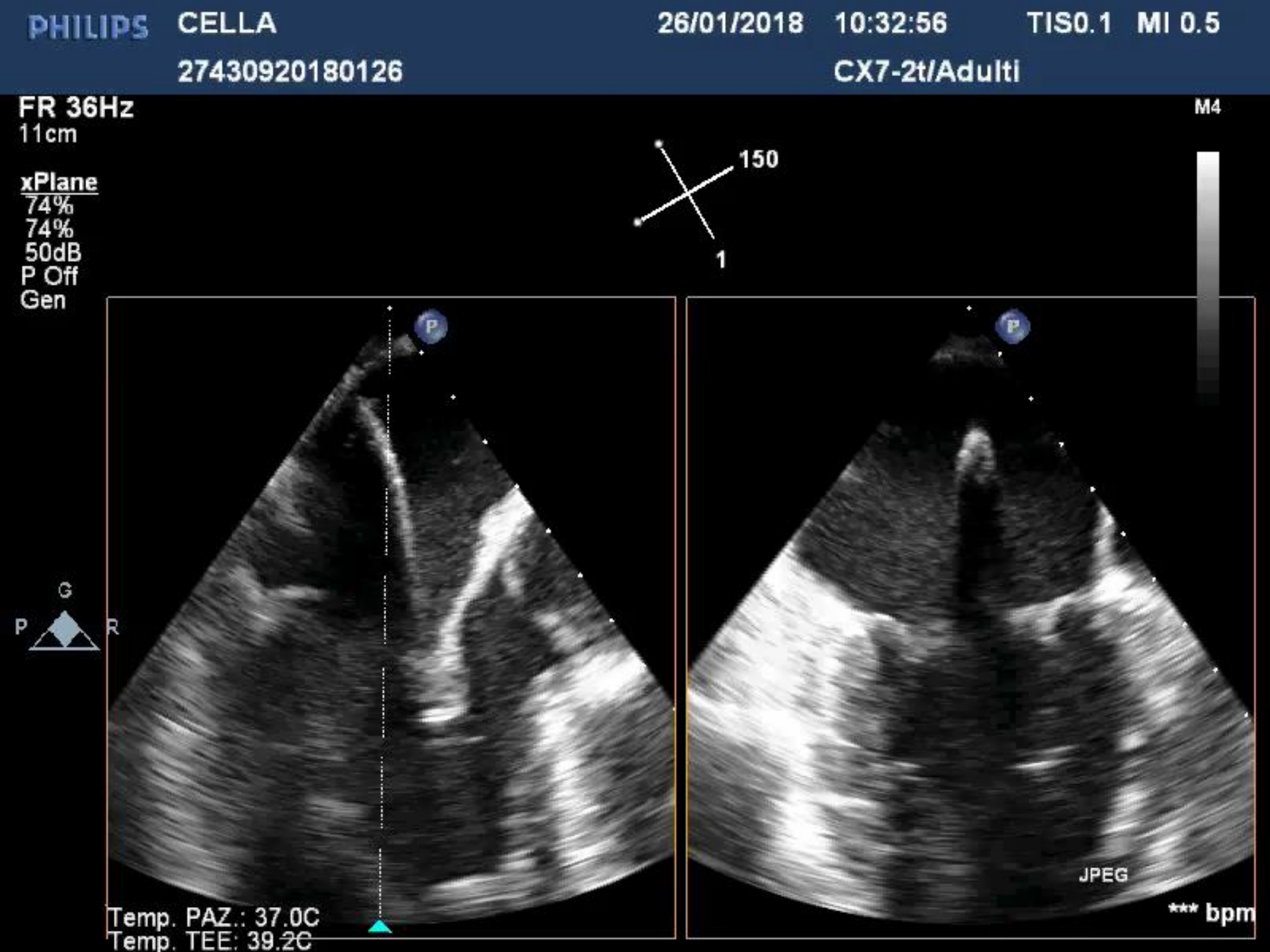
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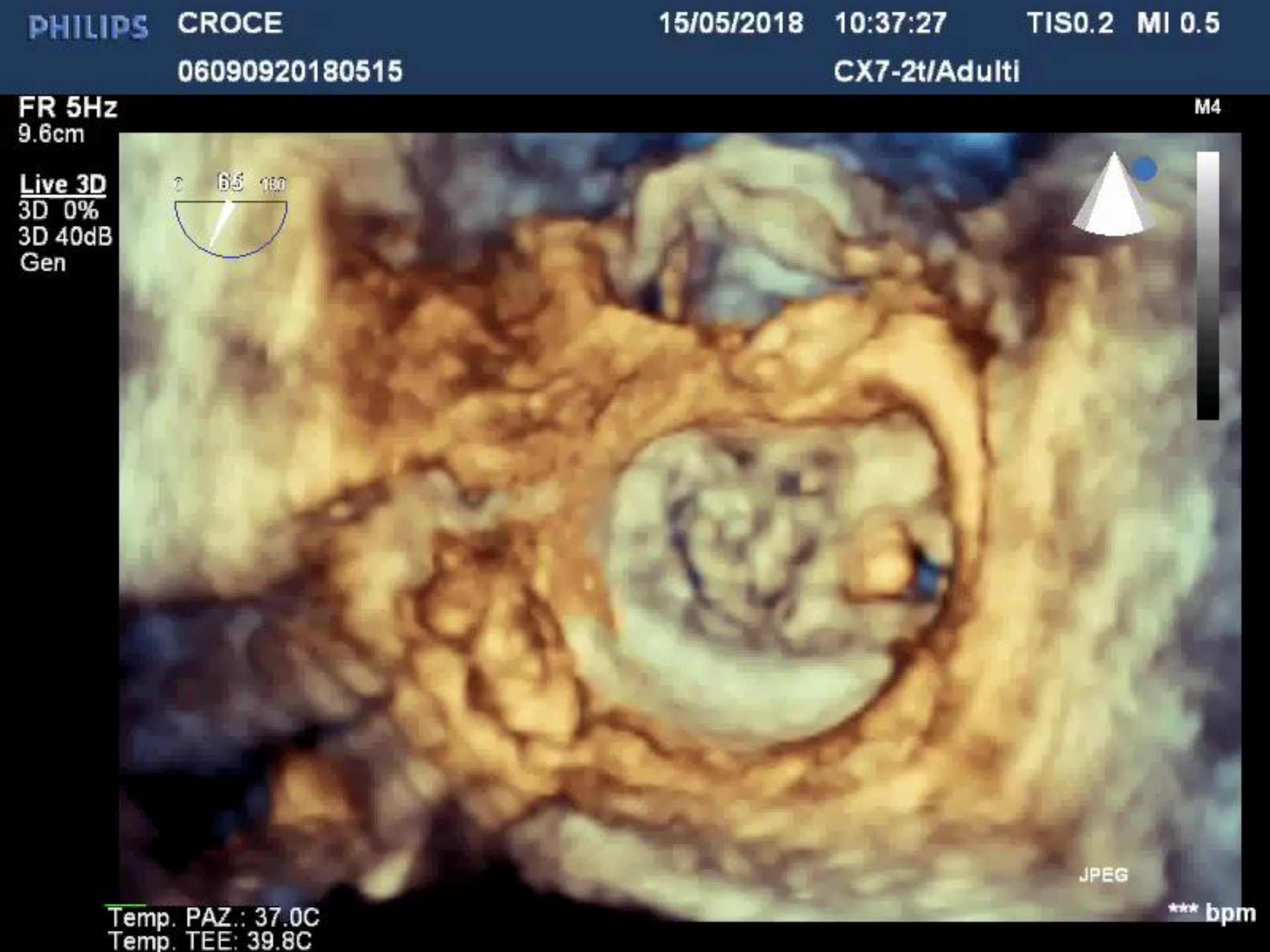
Temp. TEE: 39.2C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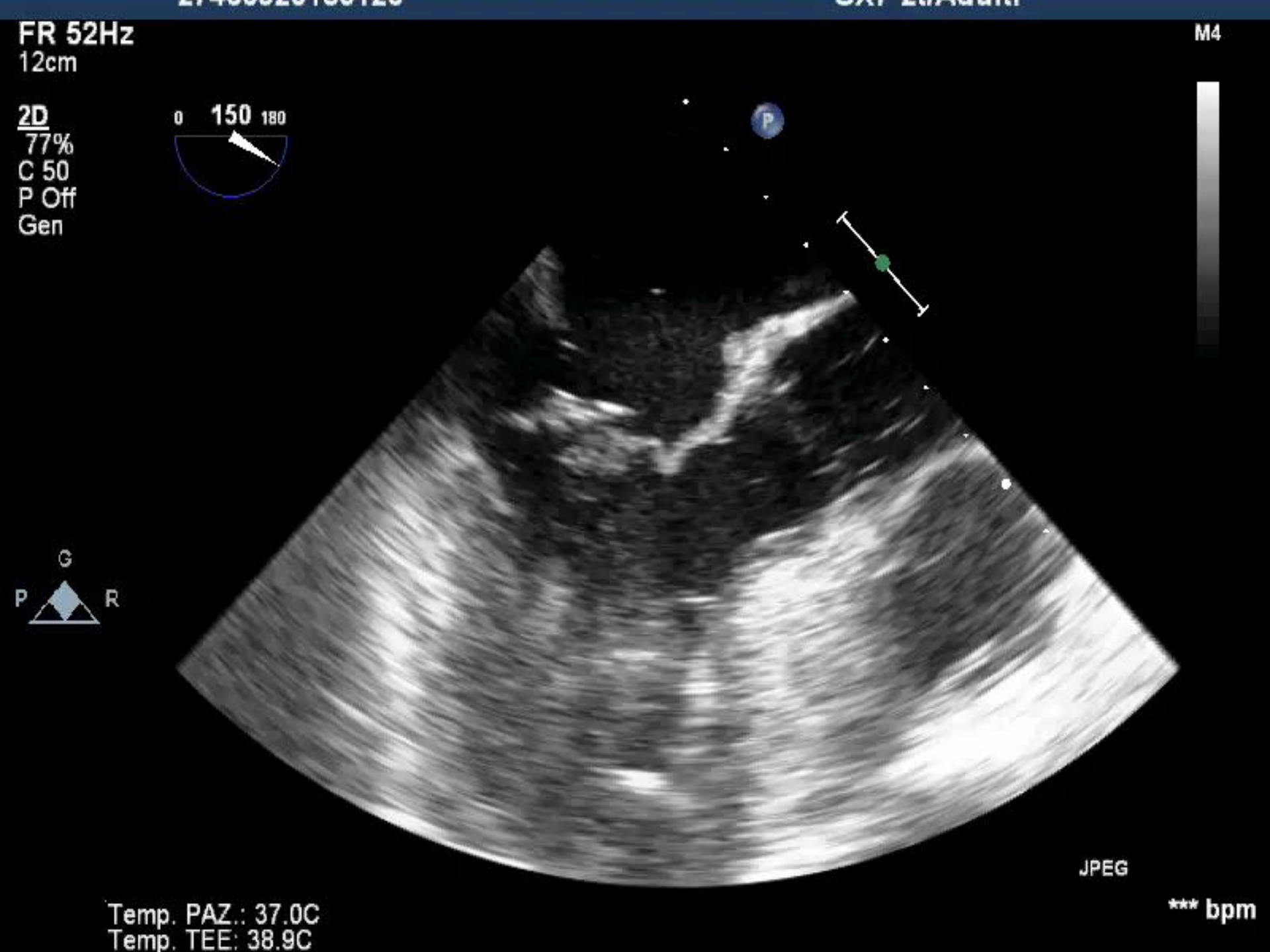
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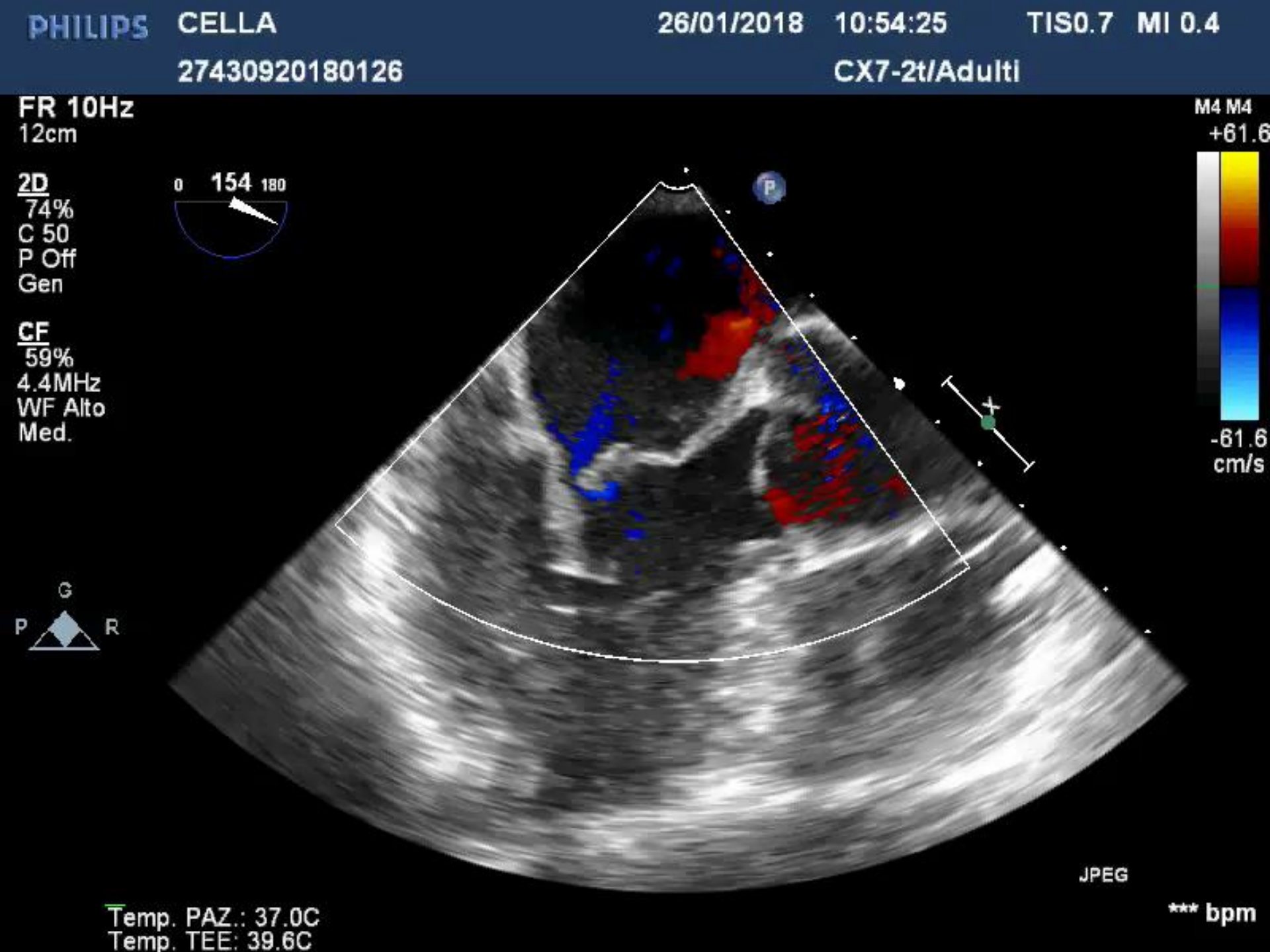
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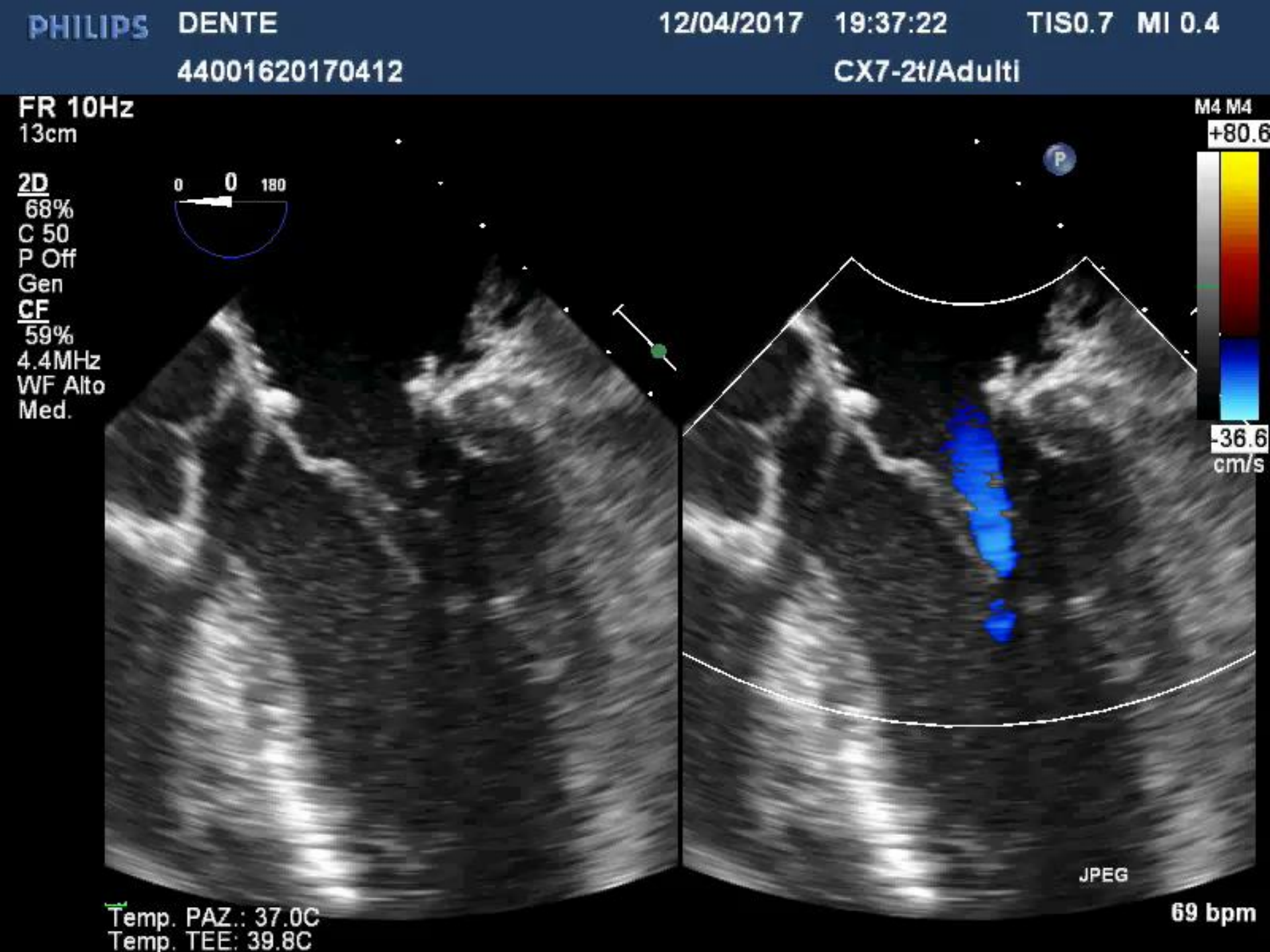
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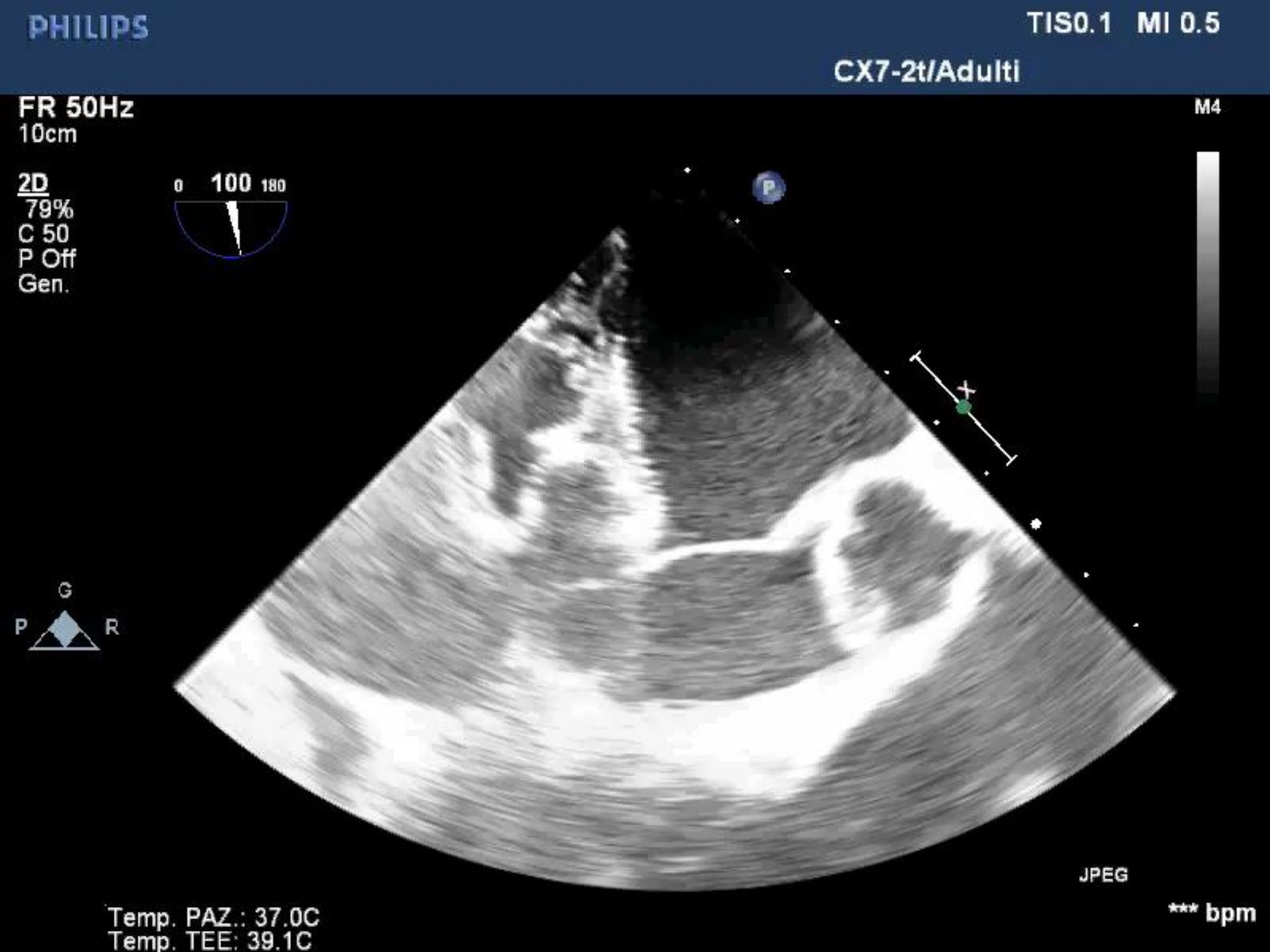
Temp. TEE: 39.8C
69 bpm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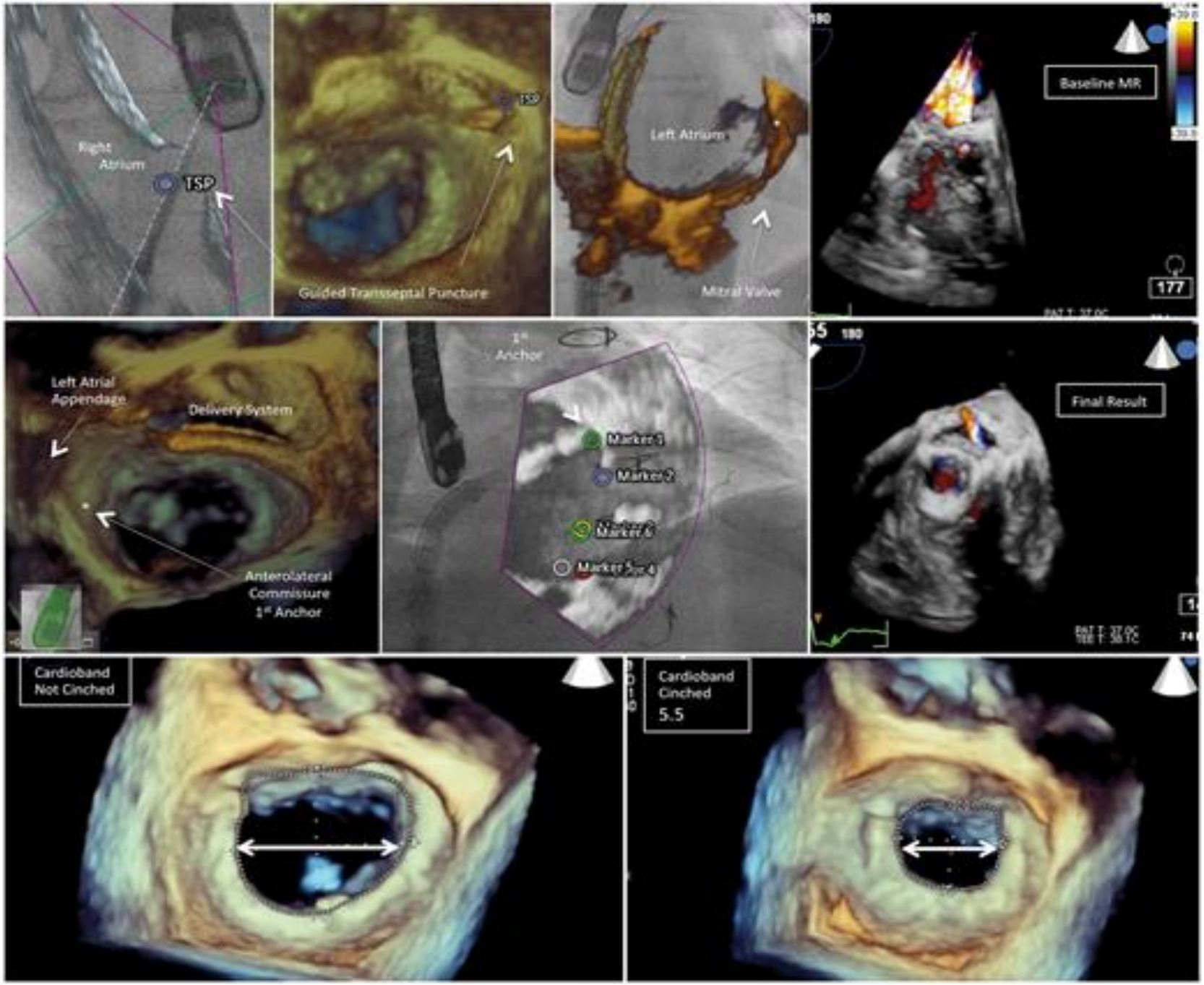
Temp. TEE: 39.1C


Right Atrium
TSP
Guided Transseptal Puncture
Left Atrium
Mitral Valve
Baseline MR
177
Left Atrial Appendage
Delivery System
Anterolateral Commissure
1st Anchor
1st Anchor
Marker 1
Marker 2
Marker 6
Marker 5
Marker 4
Final Result
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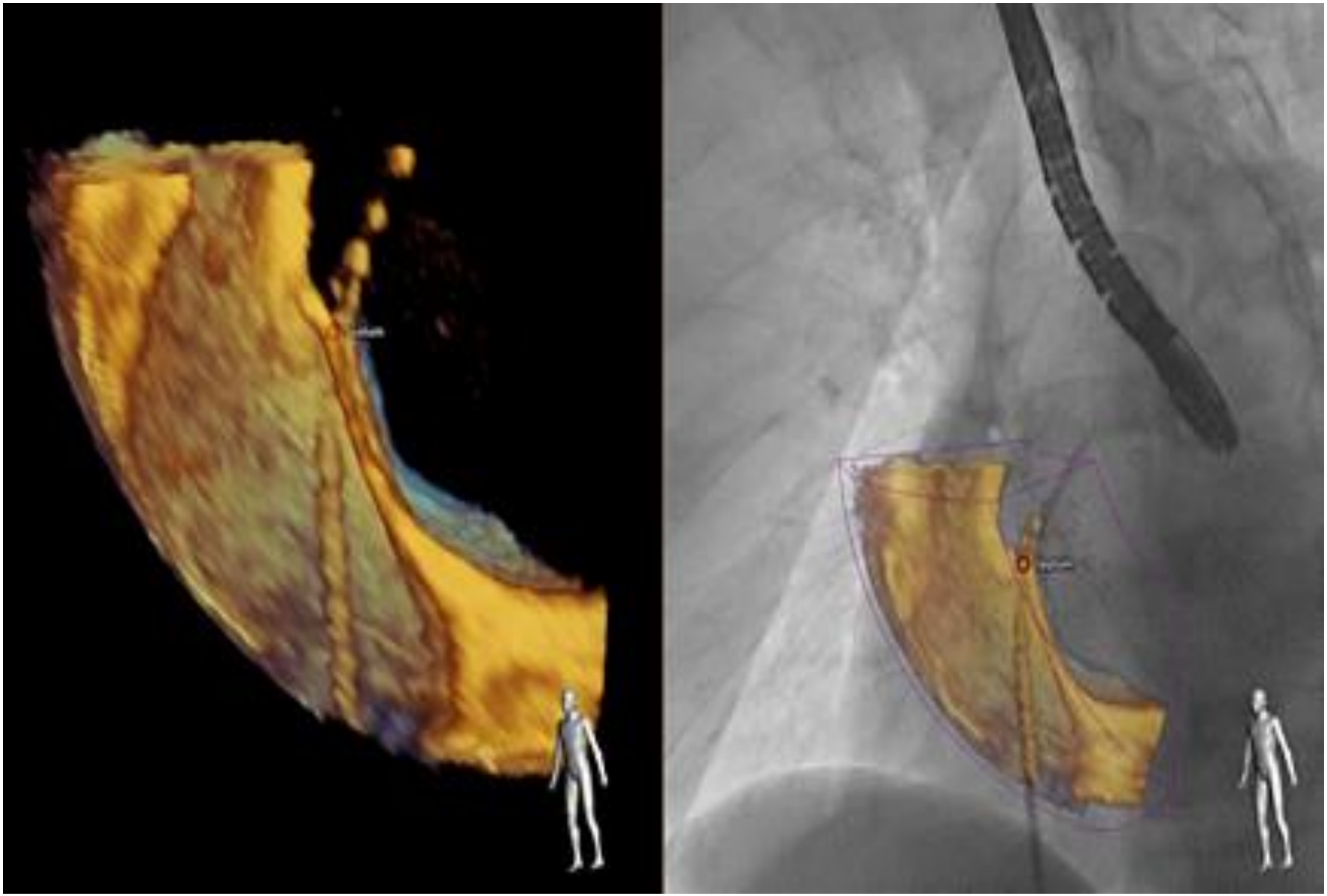
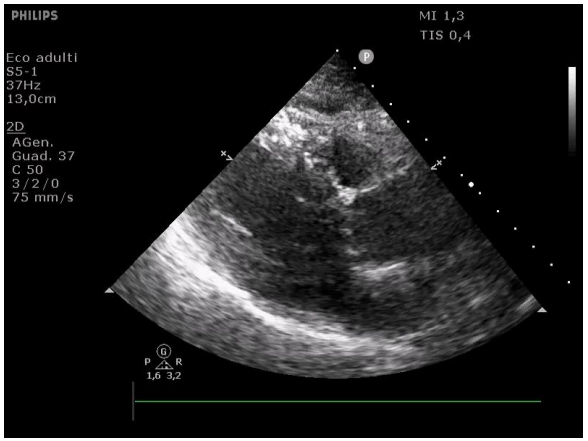
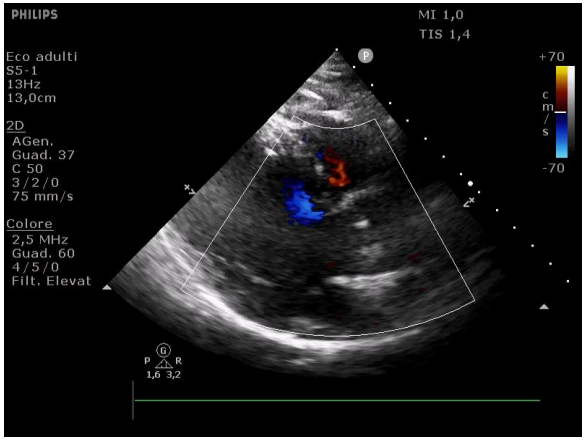
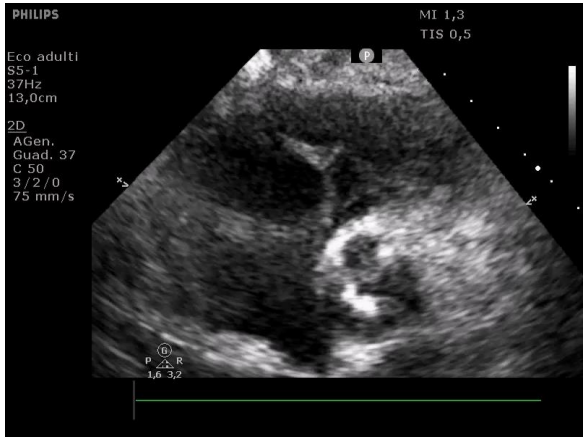


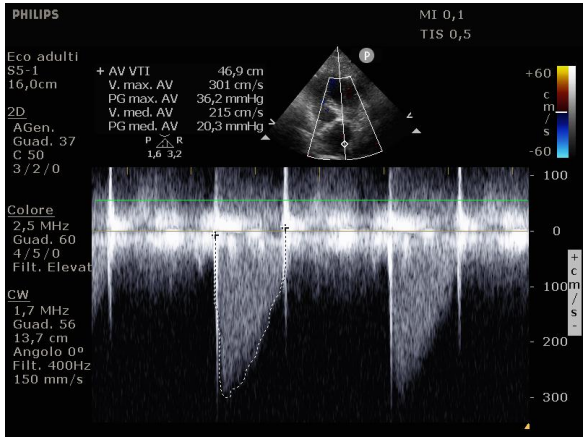


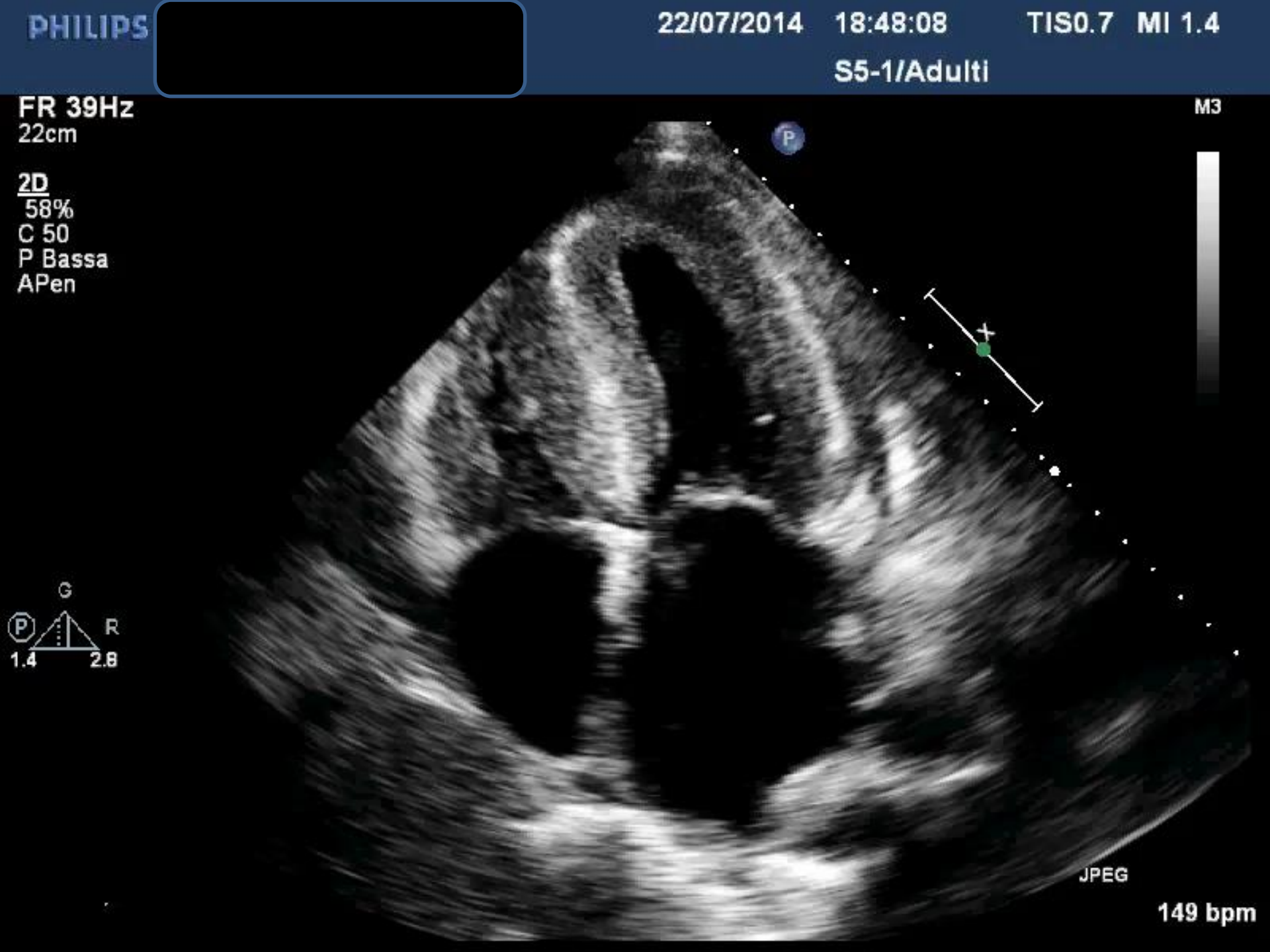
ECHO: Il Tallone d'Achille

- La finestra acustica può inficiare la valutazione





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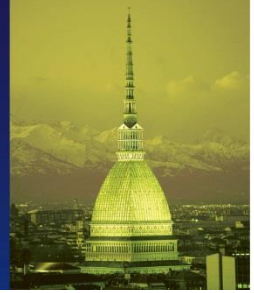


ESC European Society of Cardiology
European Heart Journal (2017) **38**, 2739–2791
doi:10.1093/eurheartj/ehx391

ESC/EACTS GUIDELINES

2017 ESC/EACTS Guidelines for the management of valvular heart disease

The Task Force for the Management of Valvular Heart Disease of the European Society of Cardiology (ESC) and the European Association for Cardio-Thoracic Surgery (EACTS)

3.1.1 Echocardiography

Following adequate clinical evaluation, echocardiography is the key technique used to confirm the diagnosis of VHD as well as to assess its severity and prognosis. It should be performed and interpreted by properly trained personnel.[1]

3.1.2.2 Cardiac magnetic resonance

In patients with inadequate echocardiographic quality or discrepant results, cardiac magnetic resonance (CMR) should be used to assess the severity of valvular lesions, particularly regurgitant lesions, and to assess ventricular volumes, systolic function, abnormalities of the ascending aorta and myocardial fibrosis. CMR is the reference method for the evaluation of RV volumes and function and is therefore particularly useful to evaluate the consequences of tricuspid regurgitation.[12]

European Heart Journal (2017) 38, 2739–2791

Aortic Regurgitation

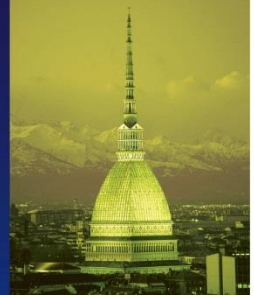
Echo (TTE & TOE):

- Morphology of valve (i.e. bicuspid valve)
- Qualitative and semi-quantitative evaluation
- Left ventricular function

MR:

- Morphology of valve in poor acoustic windows
- In BAV and in Marfan patients, evaluation of associated lesions (i.e coartaction, aortic aneurism, coronary anomalies)
- Better evaluation of regurgitant volume and fraction (RF), LVEDV and LVESV and EF.
- Good ability to predict development of symptoms and the need for surgery, if RF > 33%, better than ventriicular volume

Circulation. 2012 Sep 18;126(12):1452-60
JACC Cardiovasc Imaging. 2011 Mar;4(3):231-3



Aortic Stenosis

Echo (TTE & TOE):

- Key diagnostic tool: quantification of AS severity (velocity, gradients, functional area)
- TOE for planimetry of aortic area and anulus measurement, morphology of valve in poor acoustic TTE windows
- Quantification of degree of calcification (if CT not available)
- Follow up

MR:

- Anatomy of valve, of aortic root and descending aorta (especially in BAV)
- Differentiation of sub-valvular or supra-valvular stenosis
- Quantification of LV mass and function
- Measurement of velocity of the stenotic eccentric jet
- Negative prognostic role of LGE

J Am Coll Cardiol. 2010 Jul 20;56(4):278-87

J Cardiovasc Magn Reson. 2011 Apr 28;13:25

Mitral Regurgitation

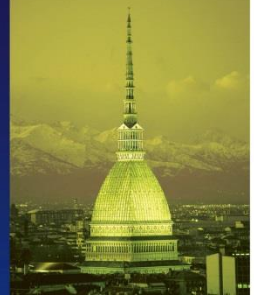
Echo (TTE & TOE):

- Principal investigation for aetiology, mechanism and severity of MR and its hemodynamics consequences (LV dilatation and/or dysfunction, PH)
- Stratification of likelihood of valvular repair

MR:

- Marginal role for MR severity evaluation
- Accurate LV volume and function evaluation
- Emergent prognostic role in asyntomatic patients with severe MR

J Heart Valve Dis. 2004 Jul;13(4):600-7



Pulmonary Regurgitation

Echo (TTE & TOE):

- Only first step, because of…

✓ Position of PV and RVOT behind the sternum
✓ Lack of definite echo qualitative criteria for PR evaluation
✓ Complex geometry of RV

MR:

- Measurements of RV volumes and function
- Evaluation of regurgitant volume
- Anatomical evaluation of pulmonary arteries
- Quantification of lung blood flow downstream of pulmonary bifurcation
- RVEDV < 160 ml/mq indicate grater chance of inverse remodeling after pulmonary valve replacement in chronic PR following Tetralogy of Fallot repair

Radiographics. 1996 May;16(3):467-81.
Semin Thorac Cardiovasc Surg Pediatr Card Surg Annu. 2006: 11-22

Tricuspid Regurgitation

Echo (TTE & TOE):

- Accurate evaluation of TR severity and mechanism, annular dilatation, pulmonary pressures estimation

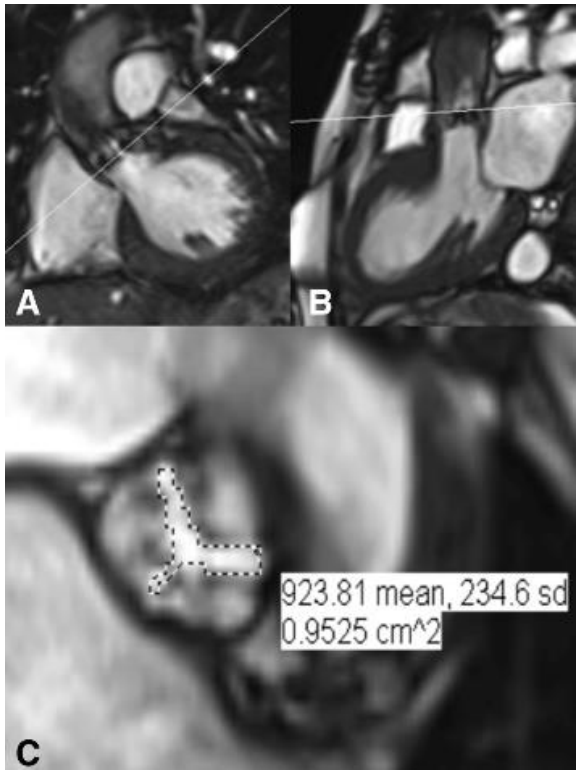
MR:

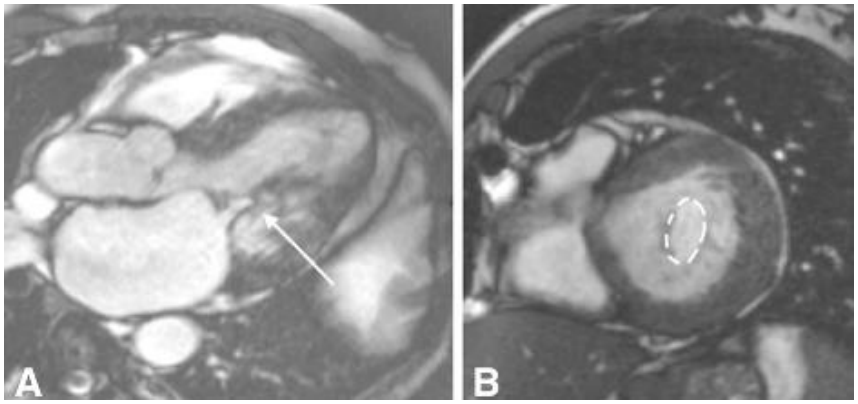
Measurement of RV volumes and function

J Cardiovasc Magn Reson. 2012; 14(1): 7

RMN: punti di forza

- La possibilità di infiniti piani di taglio, l'indipendenza dalla qualità della finestra acustica e la selezione del frame adatto all'interno del ciclo cardiaco permettono lo studio anatomico nei casi in cui l'ecografia non è dirimente e/o ci siano C.I. aTEE.





Gulsin et al. BMC Medical Imaging(2017) 17:67

RMN punti di forza: quantificazione rigurgito

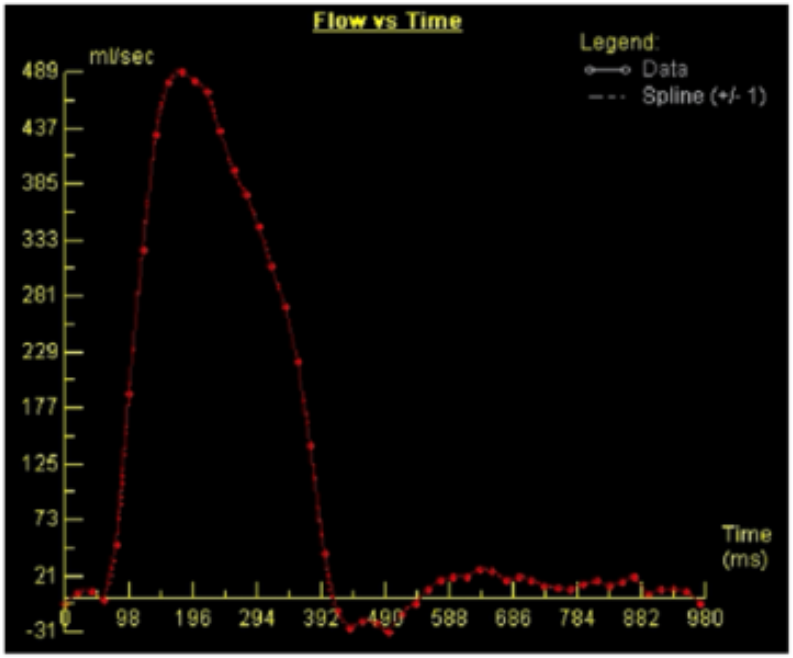
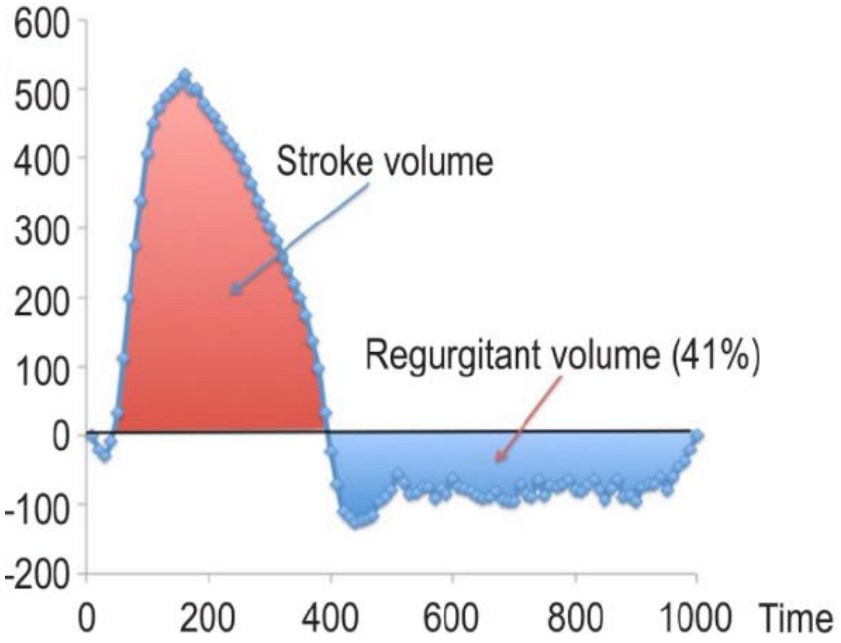


Fig. 3 A normal ascending aortic flow-time graph generated by CMR through-plane phase-contrast velocity mapping. Source: University Hospitals of Leicester NHS Trust



Gulsin et al. BMC Medical Imaging(2017) 17:67

RMN punti di forza:

- Quantificazione dei flussi e calcolo del QP/QS

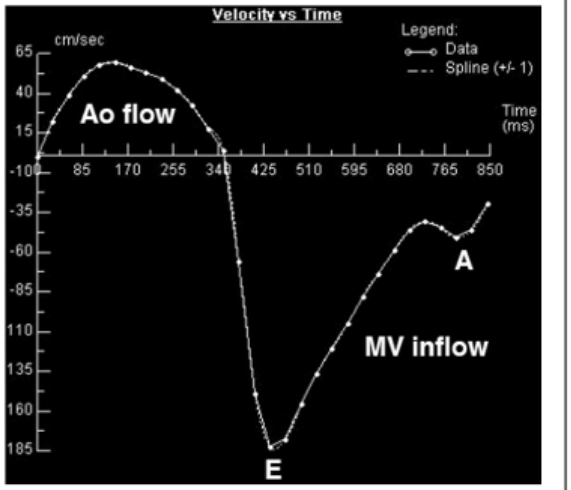
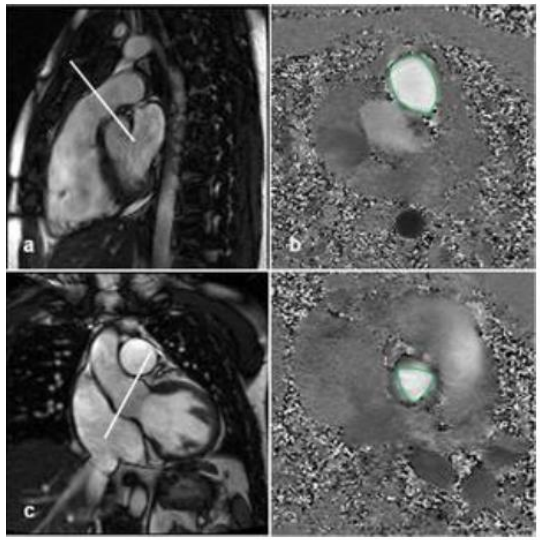
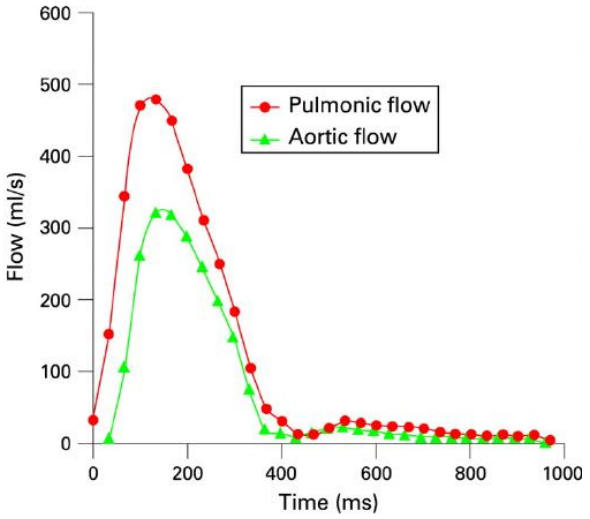


Fig. 11 Flow-time curve generated by CMR phase-contrast velocity mapping across the mitral valve (MV) in a patient with MS. Aortic (Ao) and mitral valve (MV) flow are shown. E and A waves are labelled at their respective peaks. The E deceleration time is prolonged, indicating mitral stenosis. Source: University Hospitals of Leicester NHS Trust





Gulsin et al. BMC Medical Imaging(2017) 17:67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View size: 649 x 649
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9000942012 (54 y , 52 y)
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Zoom: 271% Angle: 0
Im: 1/30
Uncompressed
Thickness: 8.00 mm Location: -8.84 mm
IA
TE: 1.486 TR: 2.9726
FS: 1.5
15/02/16, 09:59:22
Made In OsiriX


Thank
you