



LE CANAL ARTÉRIEL DU PRÉMATURÉ

Le point de vue du cardiologue

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DESC néonatalogie - Journée cardiologie 23 mai 2019



HsPDA... question for the neonatologist ?

- Several approaches
- Qualify and quantify the hemodynamic effects of the PDA : clinical and echocardiographic assessment... should we better define the thresholds ?
- Need for treatment : PDA size ?
- hsPDA based on probable outcomes : defining the population at risk for major complication of prematurity where PDA is thought to play a role

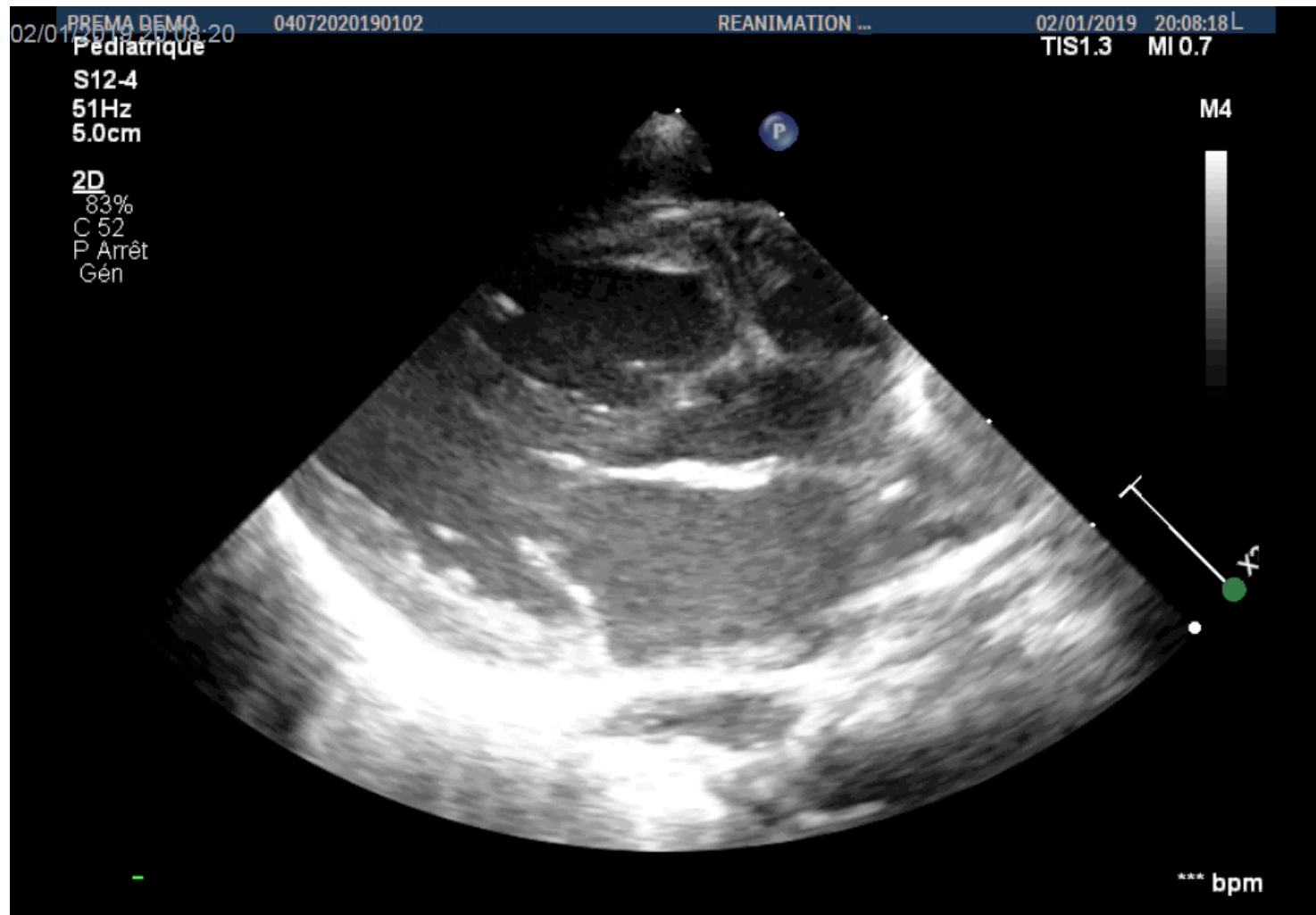
HsPDA

- Early complications (< 72h) :
 - Intraventricular hemorrhage
 - Pulmonary hemorrhage
- Mid-term complications :
 - Necrotizing enterocolitis
 - Renal failure
 - Ré aggravation de la MMH
- Late complications:
 - Pulmonary oedema
 - Non compliant lungs
 - Chronic lung disease

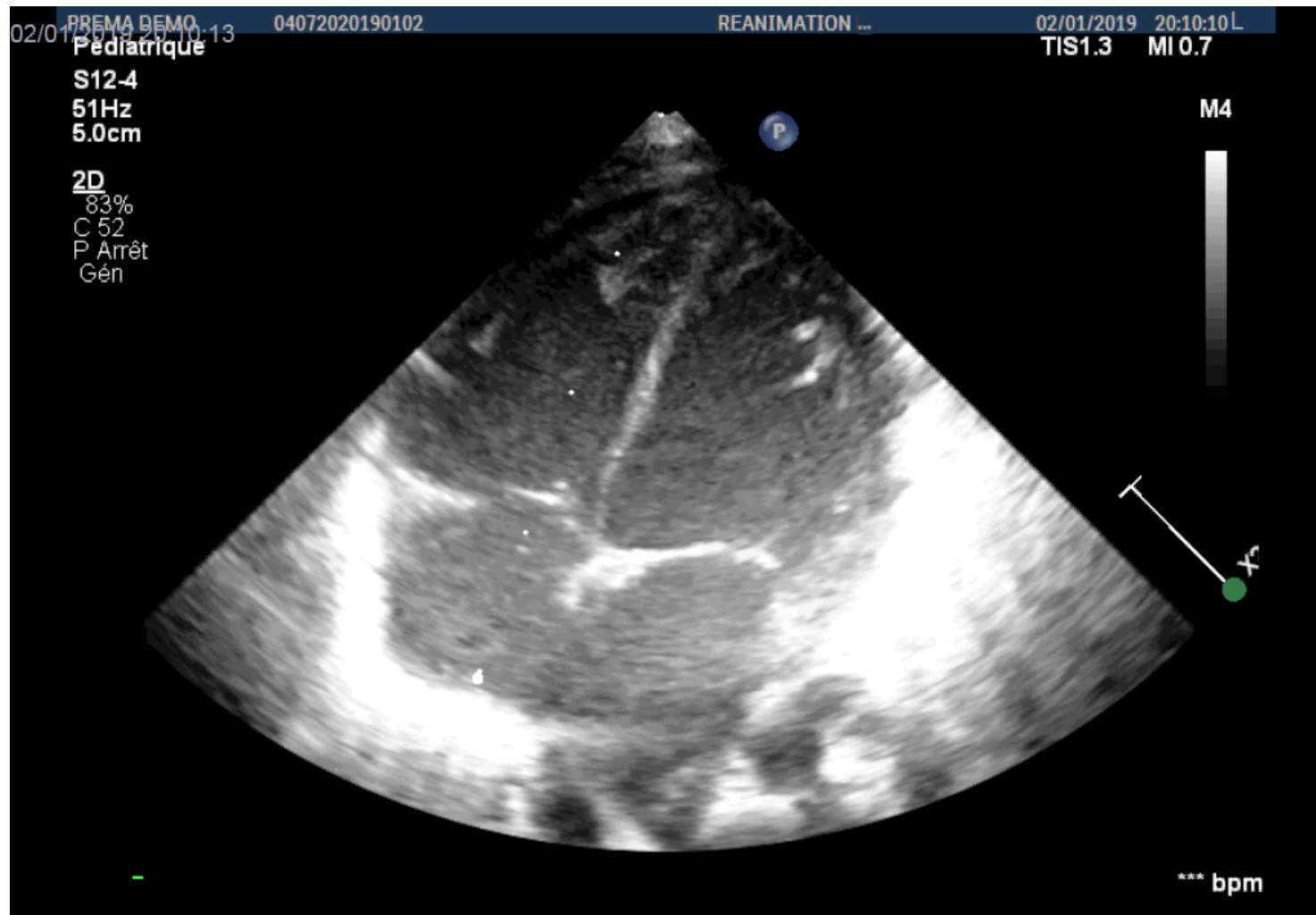
Echocardiographic indices

- Which criteria are most relevant ?
 - **Extent of volume overload**
 - **Degree of pulmonary overflow**
 - Magnitude of systemic hypoperfusion
 - PDA shunt size
- $LA/Ao > 1,5$
- $EDLVD > Z\text{-score} + 2$
- Mean flow velocity in LPA $> 0,35$ m/s
- End diastolic flow velocity in LPA $> 0,2$ m/s
- Nil or reverse diastolic flow in mesenteric artery or MCA
- Magnitude of PVR and flow velocity through the PFO
- Ductus diameter $> 1,5$ ou $1,4$ mm/kg
- PDA : a good hemodynamic assessment tool

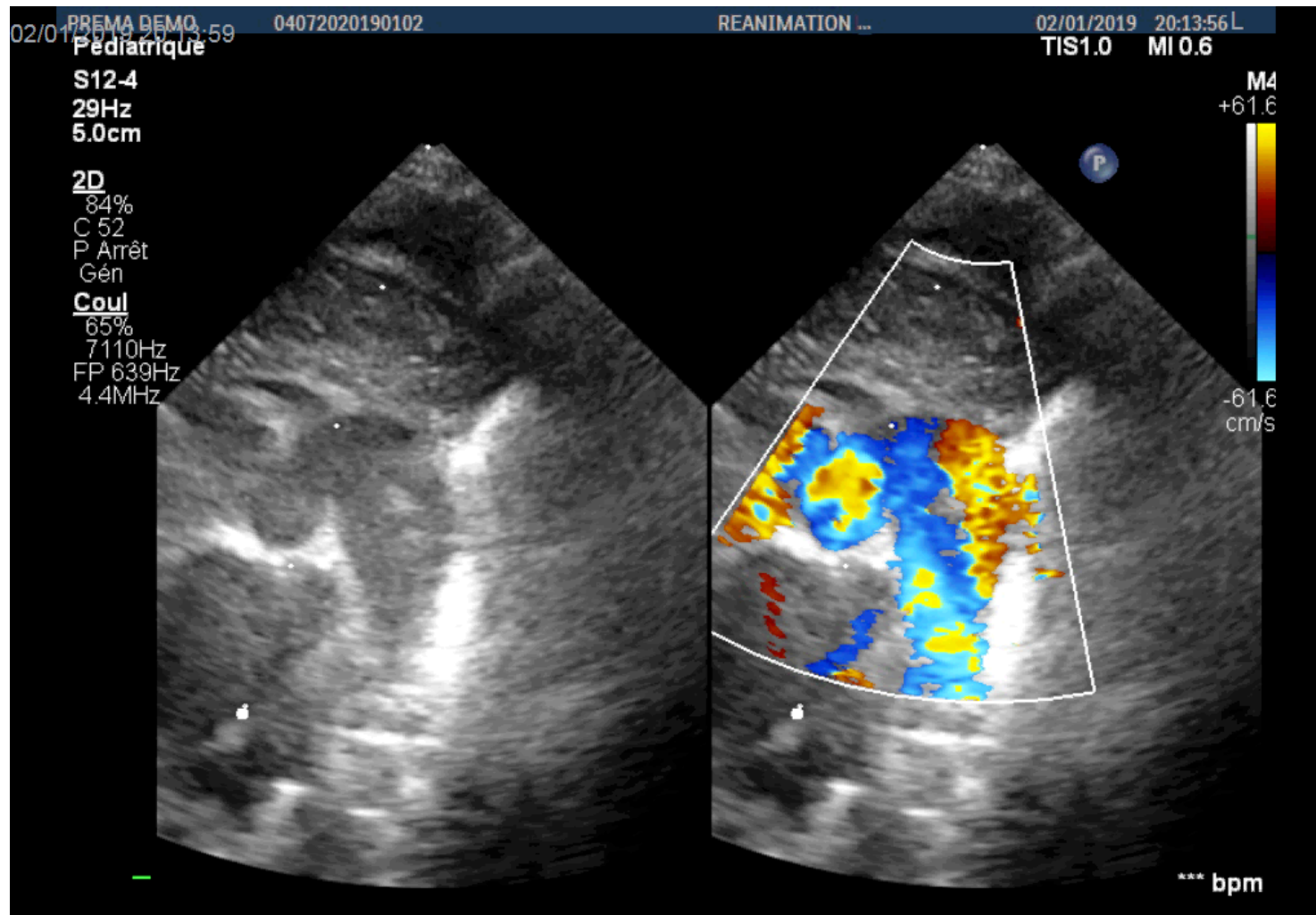
Echocardiographic evaluation



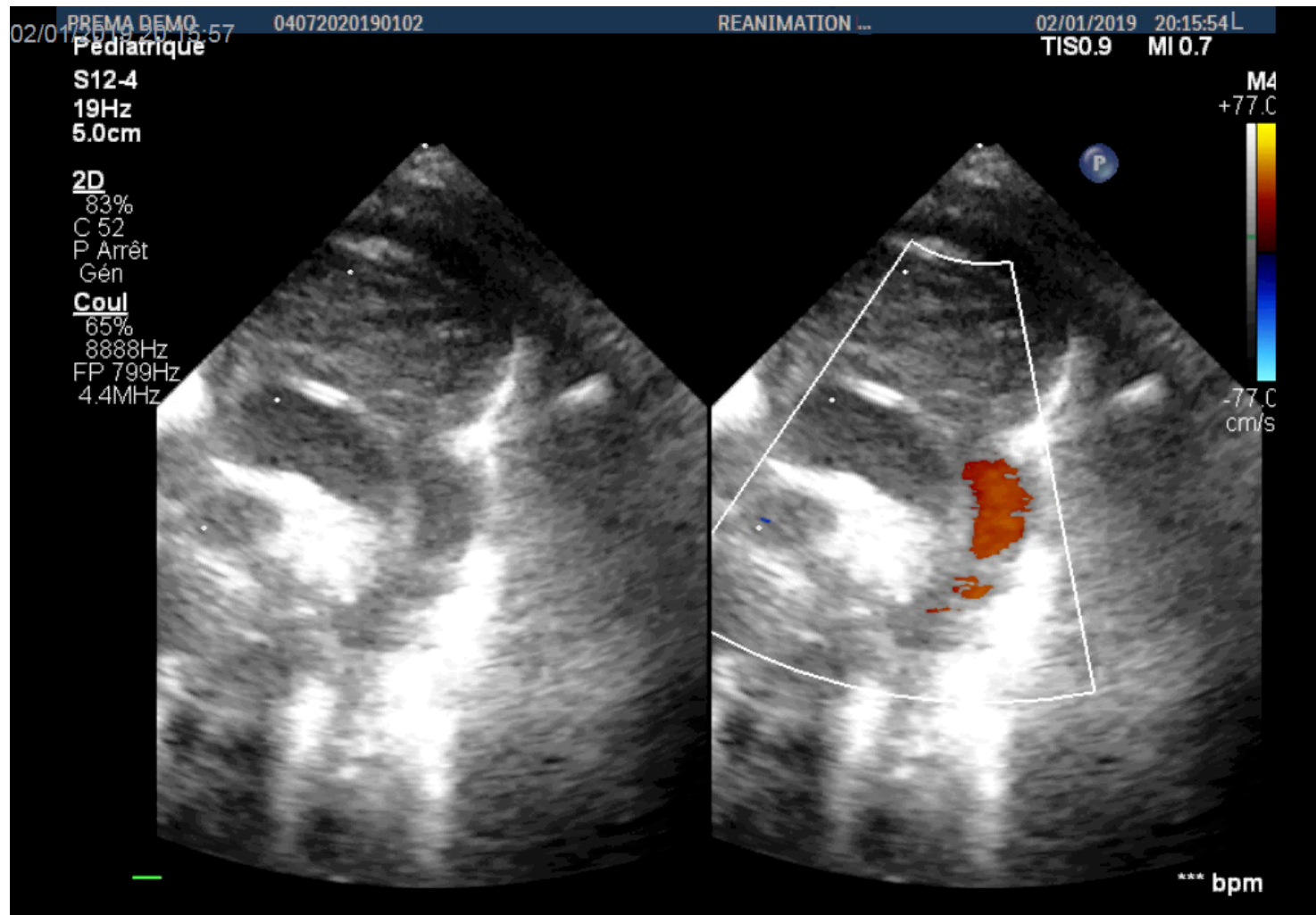
Echocardiographic evaluation



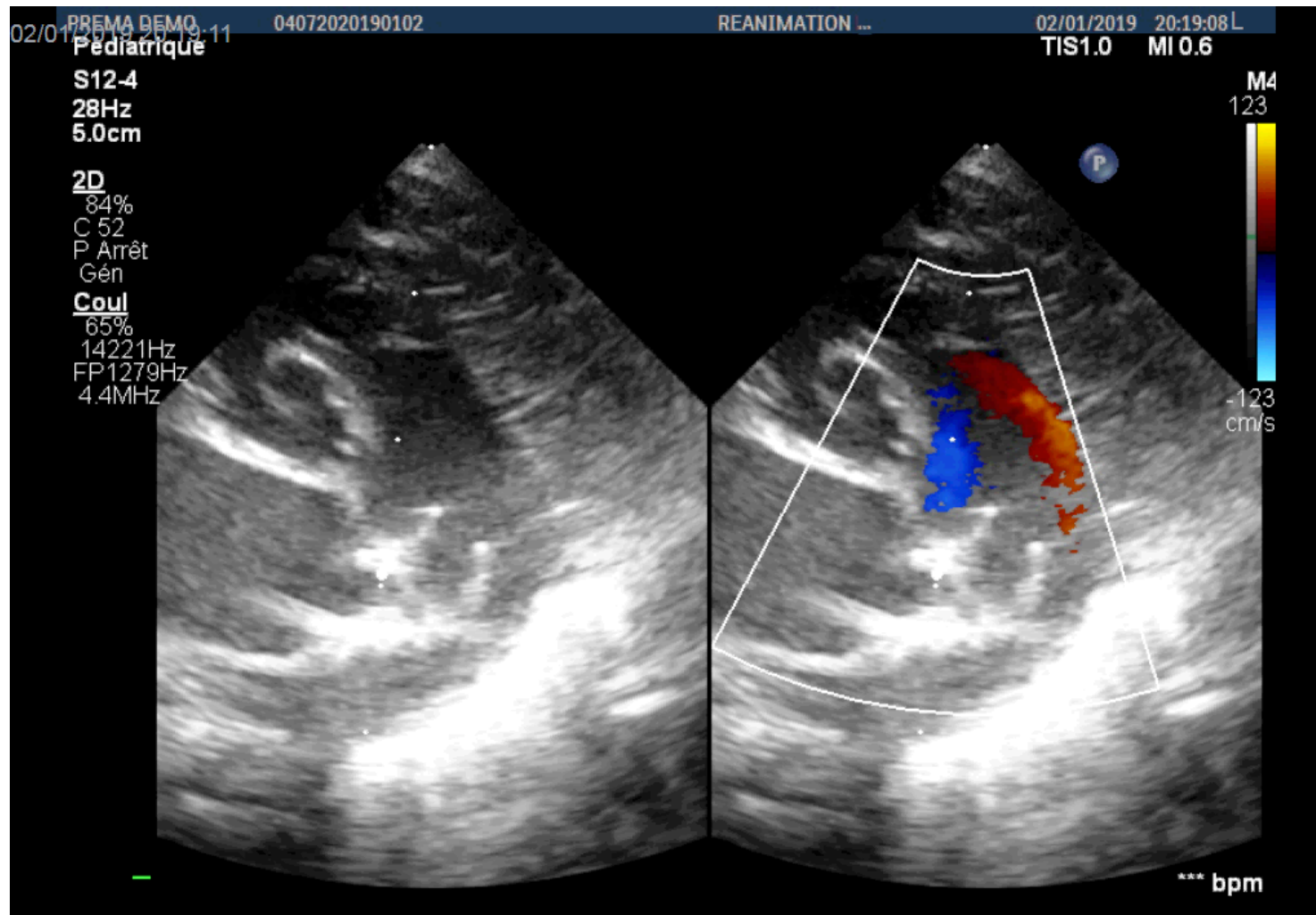
Echocardiographic evaluation



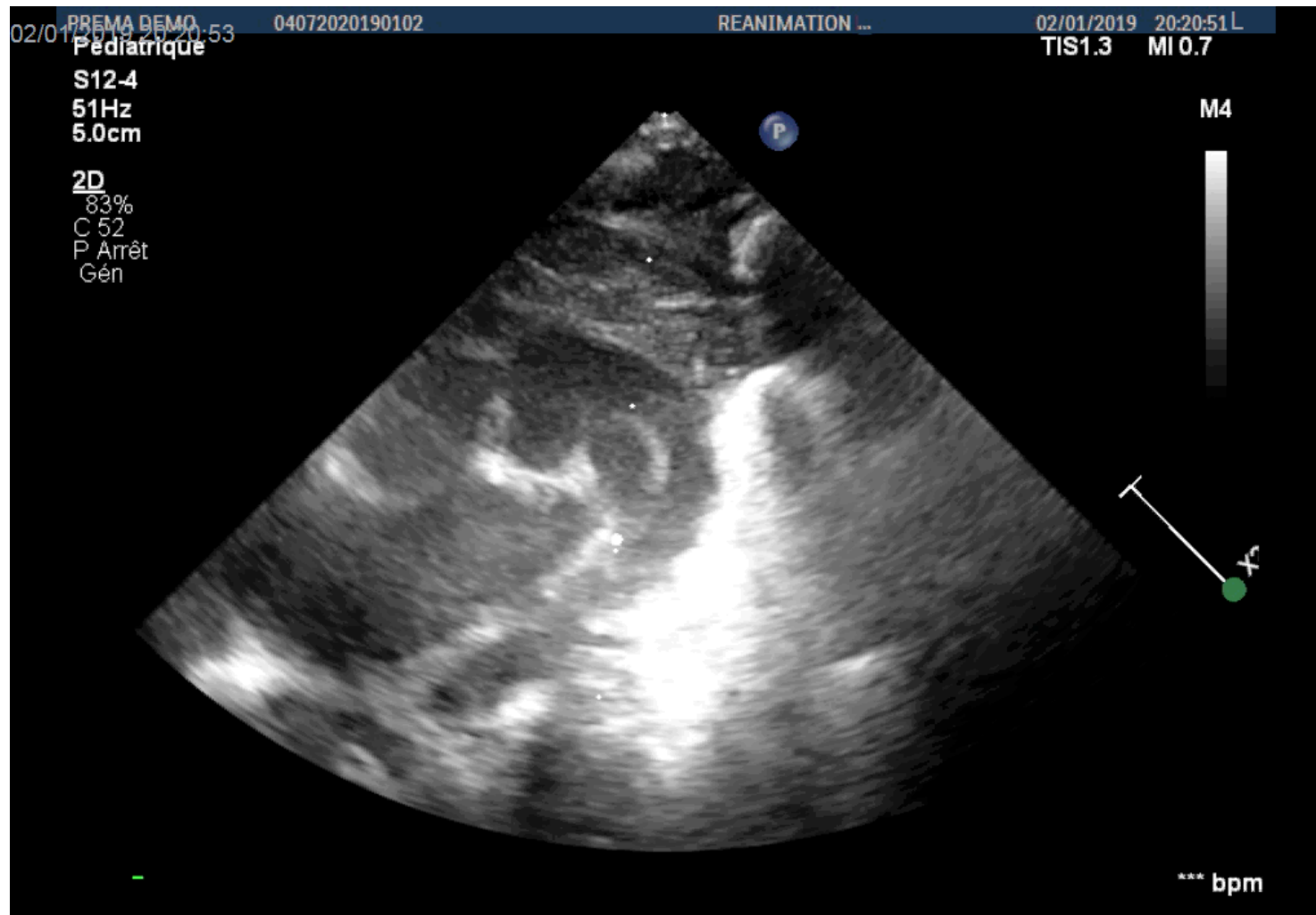
Echocardiographic evaluation



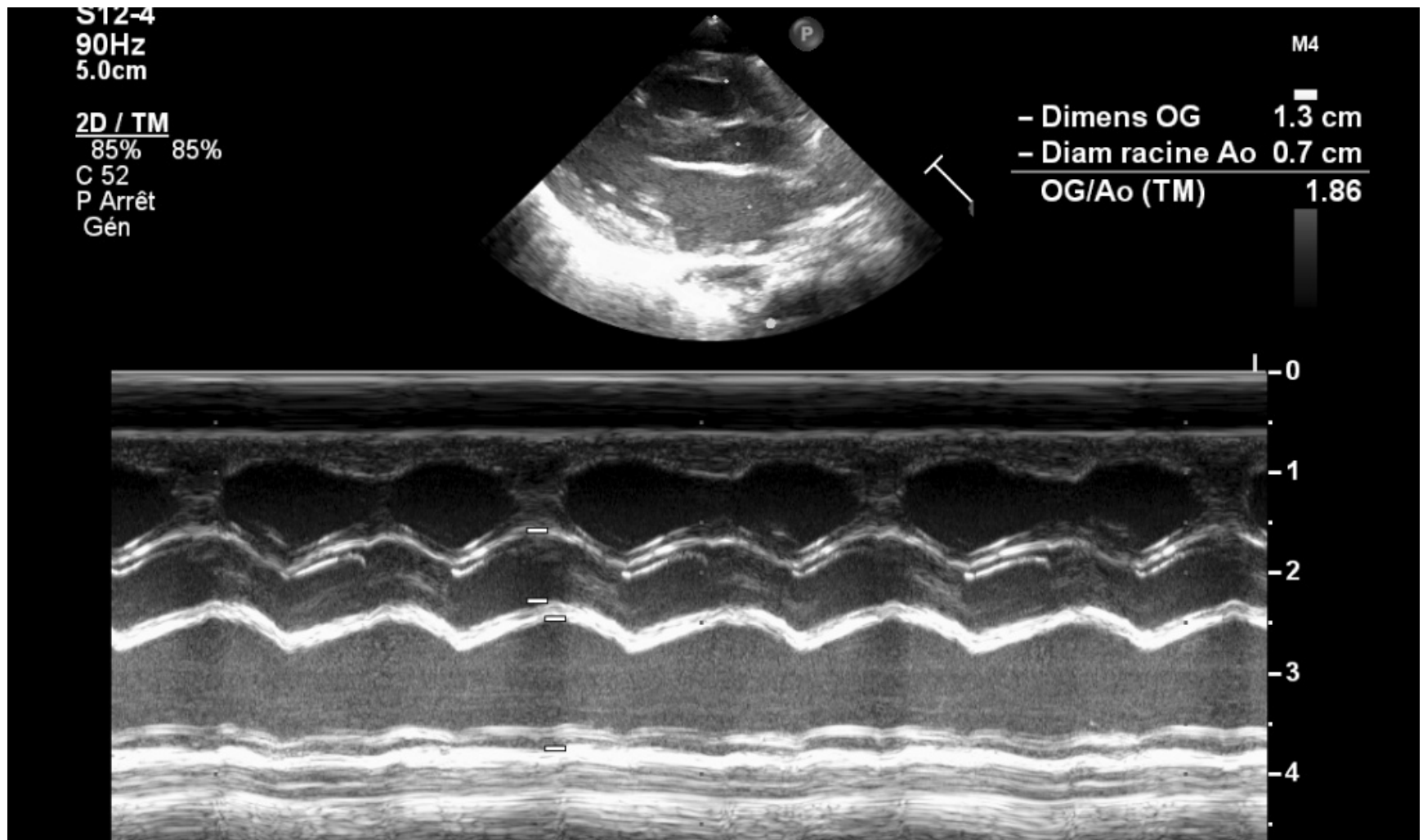
Echocardiographic evaluation



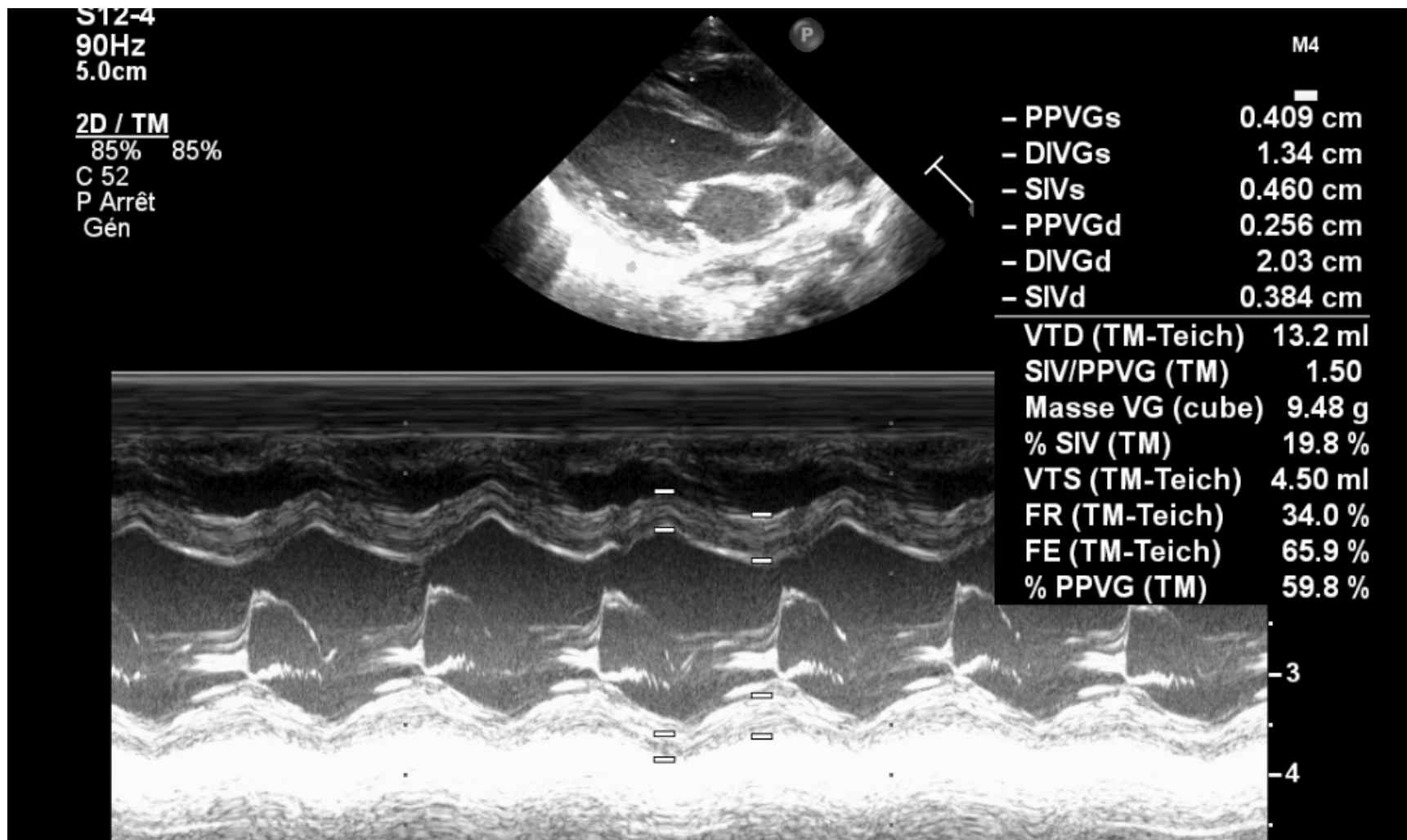
Echocardiographic evaluation



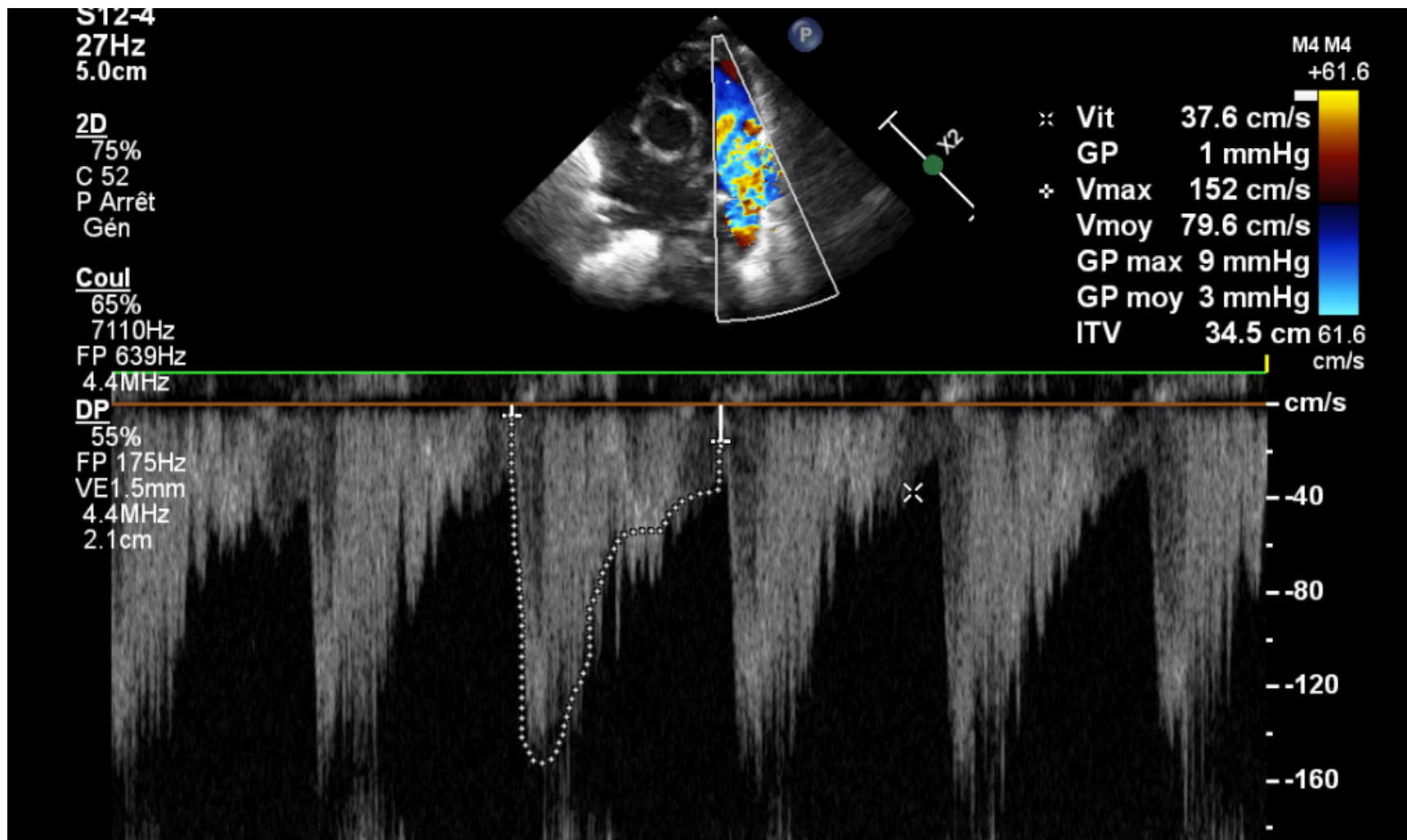
Echocardiographic evaluation



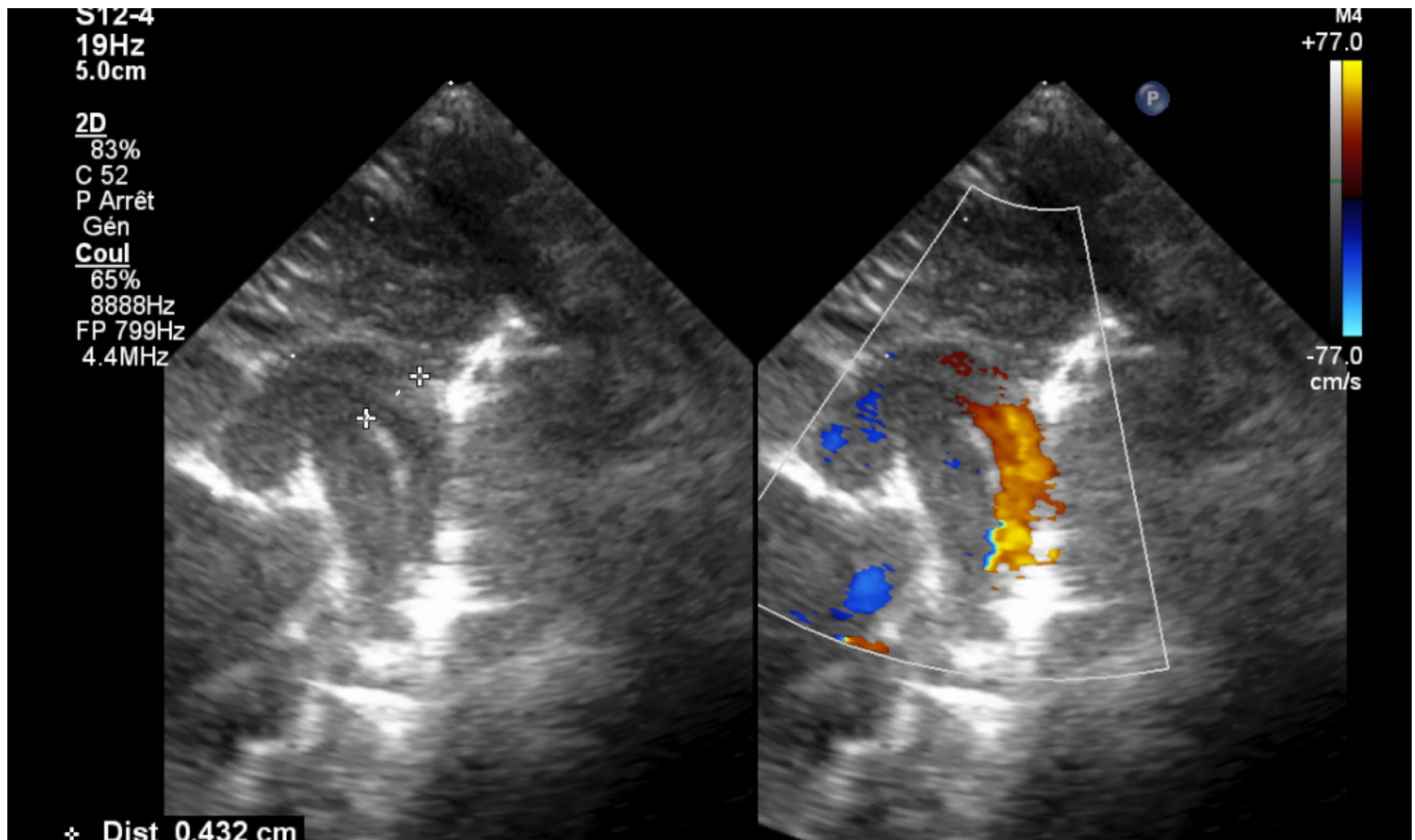
Echocardiographic evaluation



Echocardiographic evaluation



Echocardiographic evaluation



Surgical Ligation Versus Percutaneous Closure of Patent Ductus Arteriosus in Very Low-Weight Preterm Infants: Which are the Real Benefits of the Percutaneous Approach?

Rodríguez Ogando A^{1,2}, Planelles Asensio I³, de la Blanca ARS⁴, Ballesteros Tejerizo F³, Sánchez Luna M^{4,5}, Gil Jaurena JM⁶, Medrano López C^{3,5}, Zunzunegui Martínez JL^{3,5}.

- Jan 2011 to Dec 2016
- Percutaneous closure vs surgical ligation
- 25 patients percutaneous/28 surgical ligation
- Improved respiratory status after closure
- Faster in the percutaneous group
- Higher morbidity in the surgical group (recurrent laryngeal nerve palsy 17%)
- **Conclusion : Percutaneous closure of PDA in carefully selected LWPI is a safe and reliable alternative to surgical ligation**

Percutaneous closure of patent ductus arteriosus in small infants with significant lung disease may offer faster recovery of respiratory function when compared to surgical ligation.

Abu Hazeem AA¹, Gillespie MJ, Thun H, Munson D, Schwartz MC, Dori Y, Rome JJ, Glatz AC.

- **Conclusion : Percutaneous closure of PDA in small infants on respiratory support is equivalent in safety and efficacy and may offer shorter recovery time than surgical ligation**

Percutaneous closure of PDA

- Preparation
 - Intubation
 - Sedation
 - Access
 - Antioprophylaxis
- Procedure
 - No arterial access
 - Minimize use of anticoagulation
 - Minimize use of contrast (if possible NO contrast)
 - Minimize use of radiation
 - Continuous HR, ECG, BP, temperature, Saturation monitoring
- Cautions
 - Keep temp $>36^{\circ}\text{C}$ at all times using continuous temperature monitoring
 - Saturations drop with pressure on the chest from echo probe, or by keeping tricuspid and pulmonary valve open by the catheter
 - FiO₂ 100% when the PDA is crossed

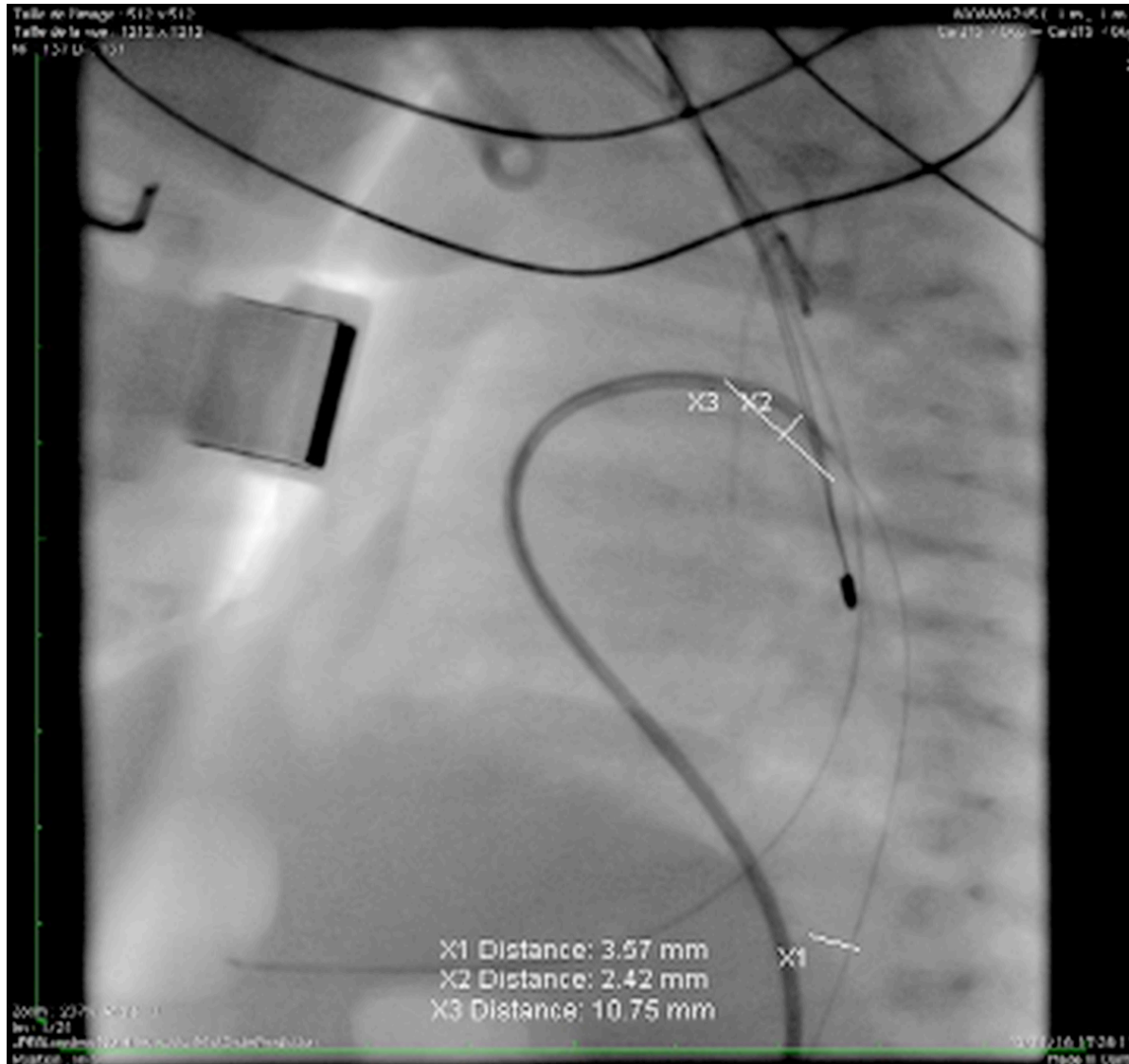
Percutaneous closure of PDA



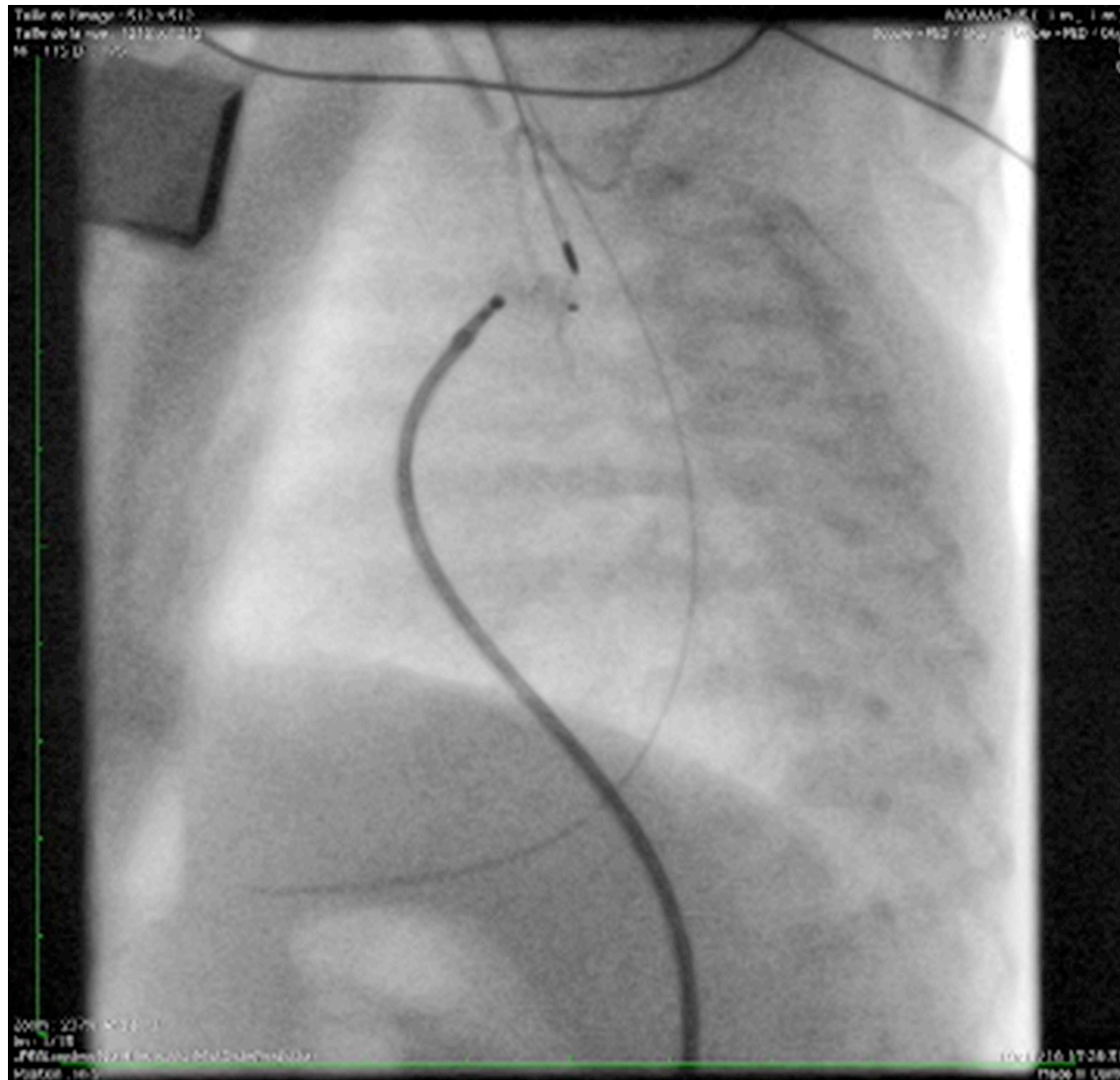
Percutaneous closure of PDA



Percutaneous closure of PDA



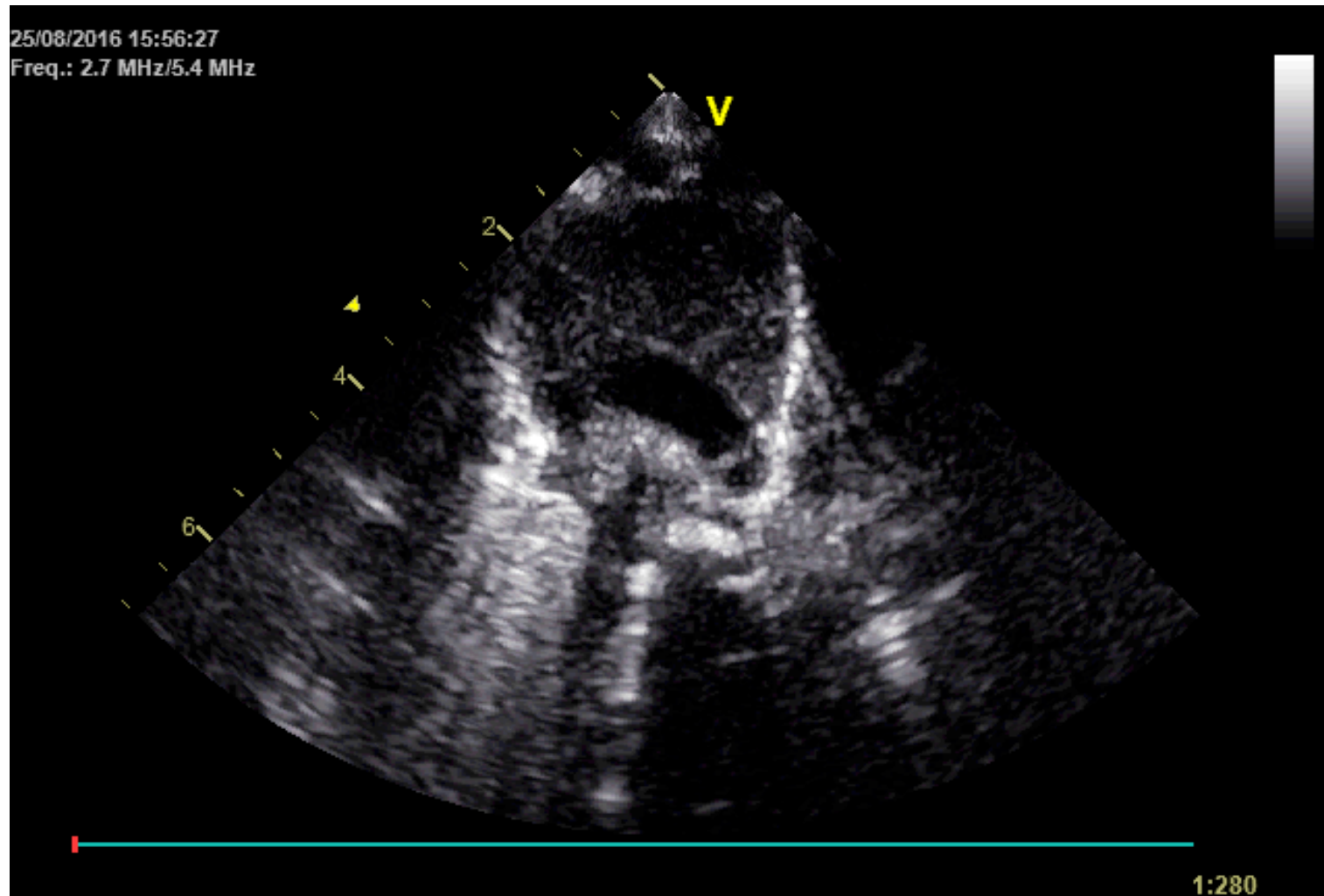
Percutaneous closure of PDA



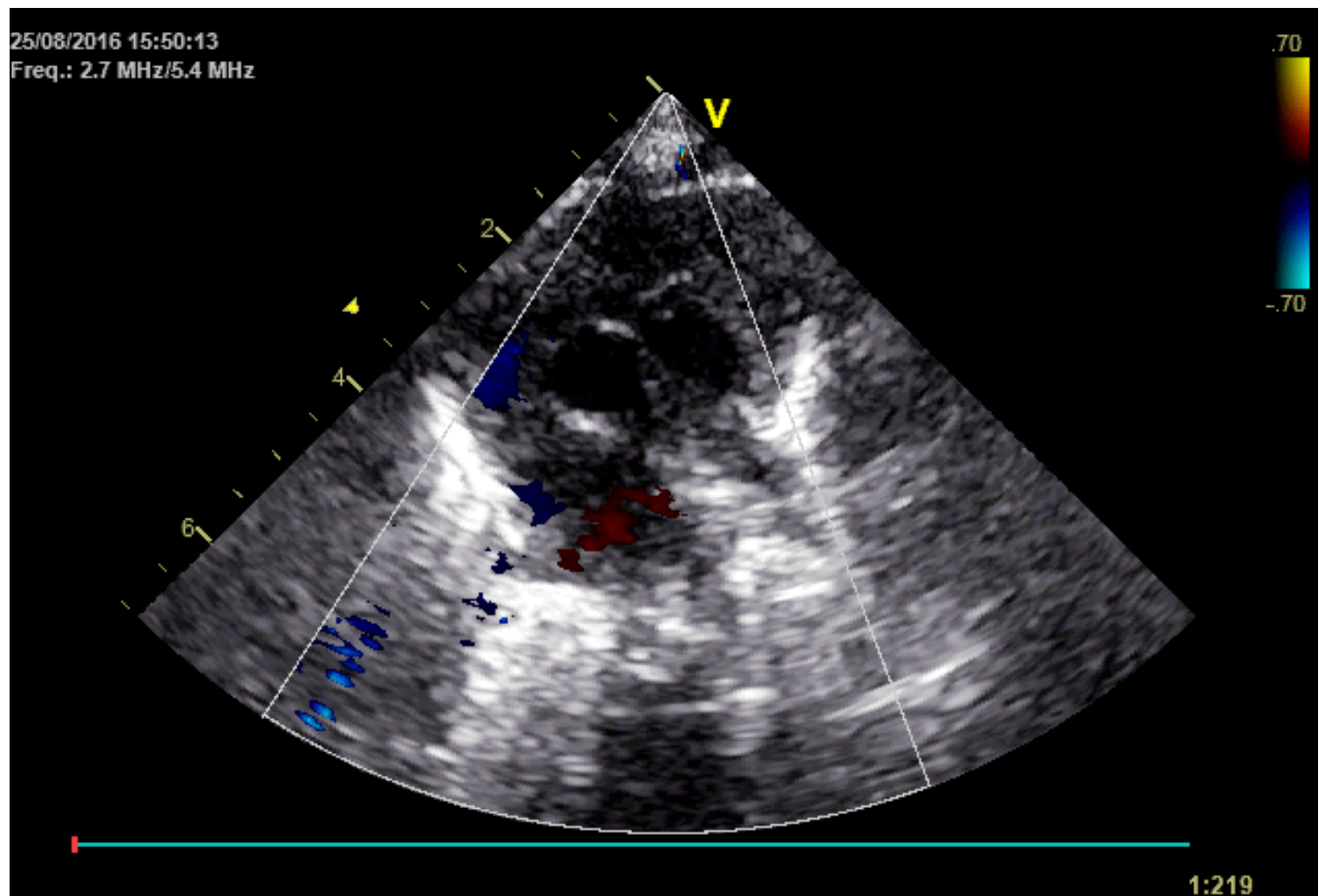
After the procedure



After the procedure



After the procedure



Adverse events

- Tricuspid Leak
- LPA stenosis
- Coarctation of the aorta
- Venous thrombosis
- Post-ligation low output syndrom

French multicentric study

- 101 patients
- retrospective data
- 4 centers: Reims, Clermont Ferrand, Grenoble and Paris

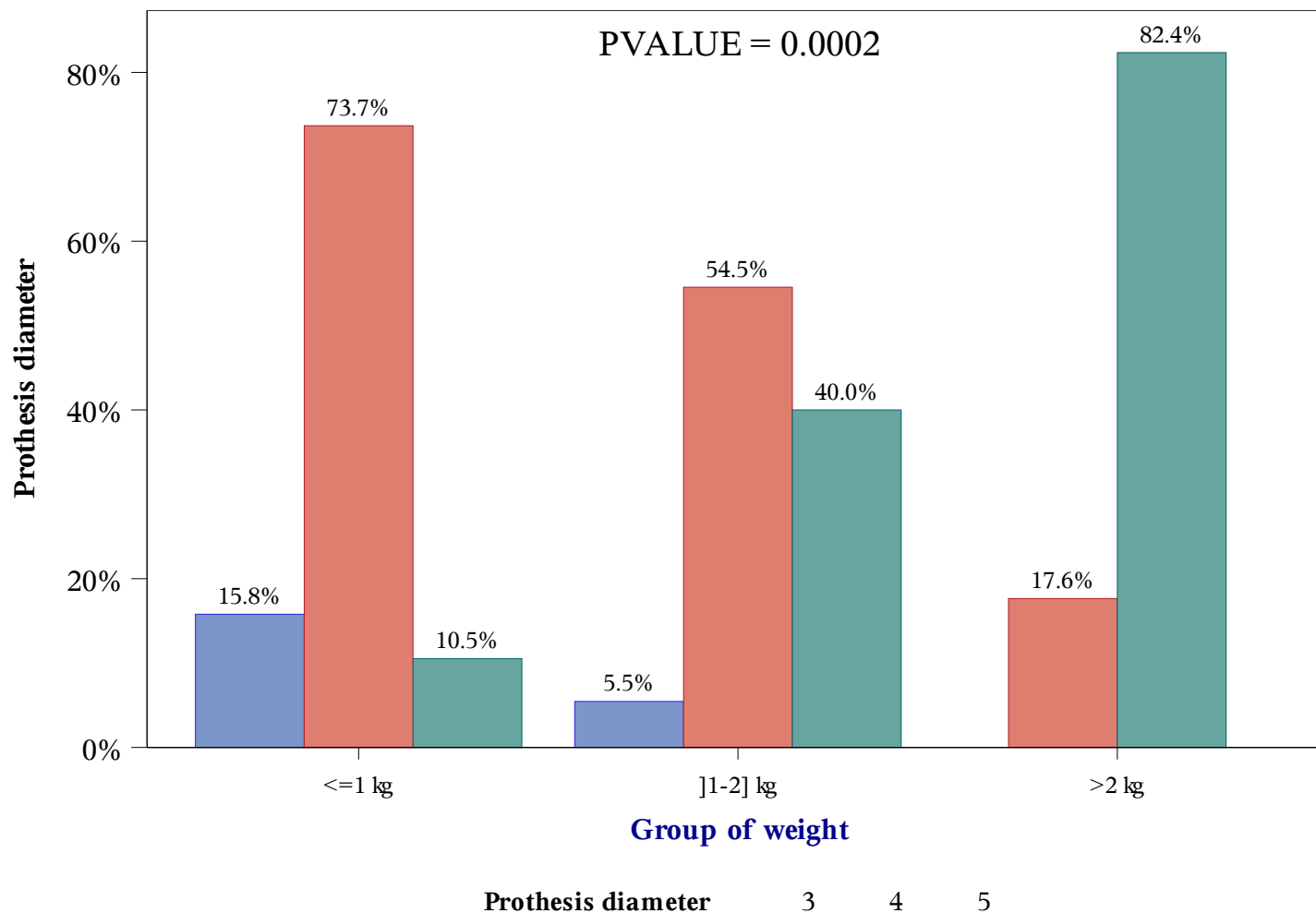
	N	GA	BW	Procedural age	Procedural weight
> 2 kg	22	30.3+/-4.5	1458 +/-730	71 +/-32	2707 +/-413
>1 to 2 kg	59	26.5 +/-1.3	882 +/-195	32 +/-13	1334 +/-234
< or =1 kg	21	25.8 +/-1.4	682 +/- 110	22 +/-8	880 +/-105

French multicentric study

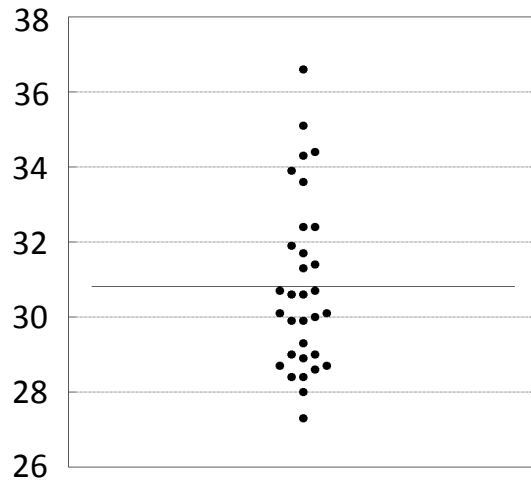
	PDA size	Fluoroscopy minutes	device	Dose mG	complications
Total	2.9 Pulm 3.2 Ao	6.5 minutes	MVP 10 ADO II AS 91 Coil 1	30 +/- 52	TR 3 Late CoA 1; Mild Ao obstr 1 LPA obstruction 3
> 2 kg	2.8 Pulm 3.6 Ao	6.9 minutes	MPV 4 ADO II AS 17 (5*2, 5*4, 5*6) Coil 1 1 sheathless	49 +/- 74	1 failure: too large, spontaneous closure 72h post procedure
1 à 2 kg	2.8 Pulm 3.1 Ao	6.5 minutes	MVP 4 ADO II AS 54 (4*2 et 5*2) 1 sheathless	29 +/- 49	LPA obstruction 3 TR 2
< 1 kg	3.2 mm	6.1 minutes	MVP 2 ADO II AS 19	11 +/- 9	Late CoA TR 1

French multicentric study

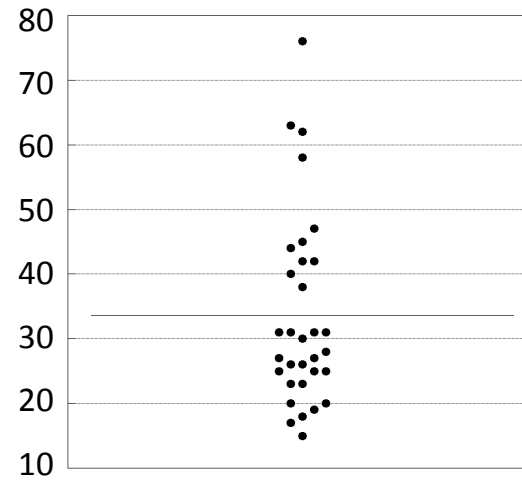
2. Categorized prosthesis diameter according to the weight birth group



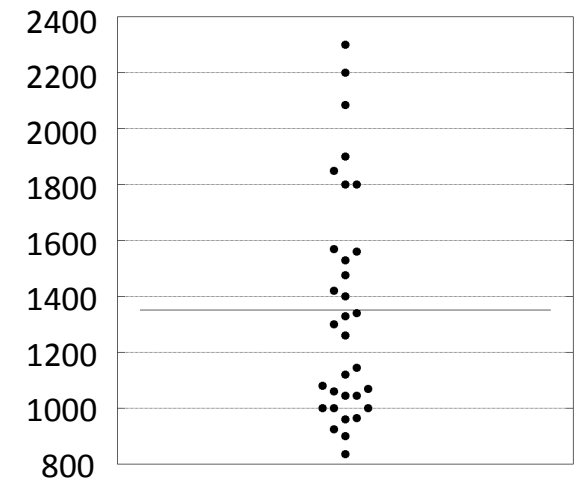
Recent experience in Paris



Age gestationnel (SA)

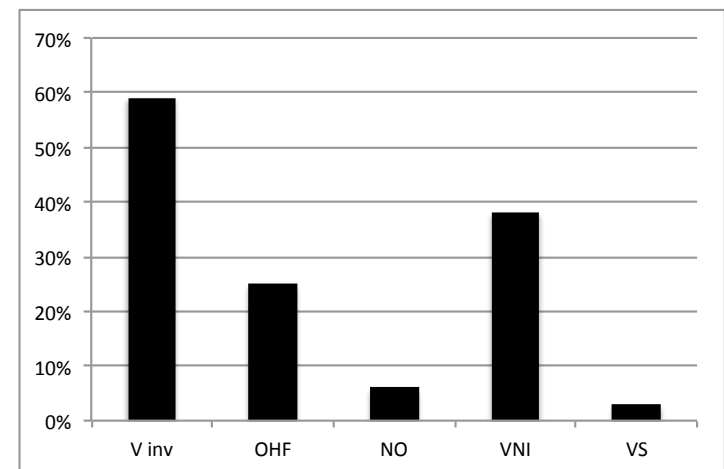


Age réel (j)



Poids (g)

Since october 2017



Next challenging cases

- Weight of the baby
- Size of the ductus arteriosus
- Size of the ductus arteriosus/Weight of the baby
- Timing of percutaneous closure ?



Merci de votre attention