

Successful IVUS guided Transcatheter Closure of Patent Ductus Arteriosus

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Patent Ductus Arteriosus (PDA)

- Ductus arteriosus is a vascular structure that connects the proximal descending aorta to the roof of the main pulmonary artery near the origin of left pulmonary artery.
- It normally closes spontaneously within 24 to 48 hours after birth.
- Incidence of PDA is approximately 1 in 2000 in full term infants and in adulthood, a PDA is not often encountered since it is usually discovered and treated during childhood.
- The mortality of untreated PDA in adults (without correction for the size of the PDA) is estimated to be 1.8% per year.

Treatment of PDA

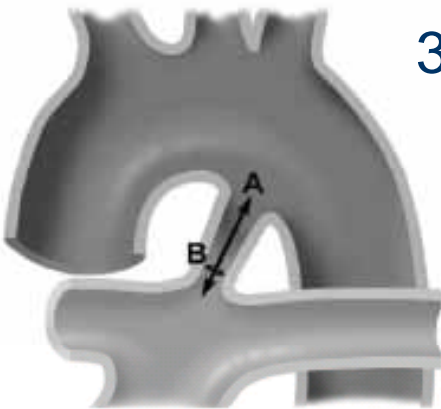
- The definitive treatment of PDA is by closing it either by transcatheter approach or by surgery.
- Transcatheter closure is well established method for treating a PDA in adult.
- But, surgical closure is still the method for treating very large PDA not amendable for catheter intervention.



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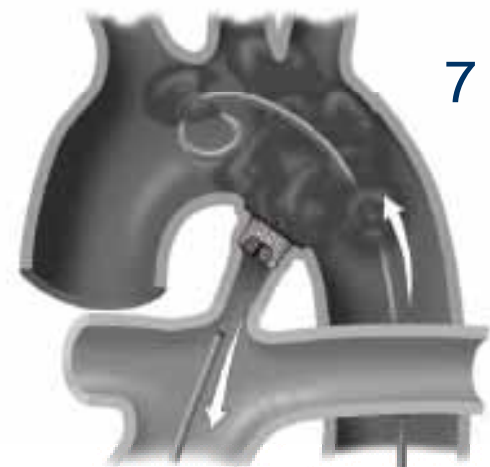
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Treatment of PDA

- Accute defect sizing is crucial and mandatory for AMPLATZER Duct Occluder device selection.
- But, it is difficult to measure the exact size of shunt in the case of catheter procedure of congenital anomaly,

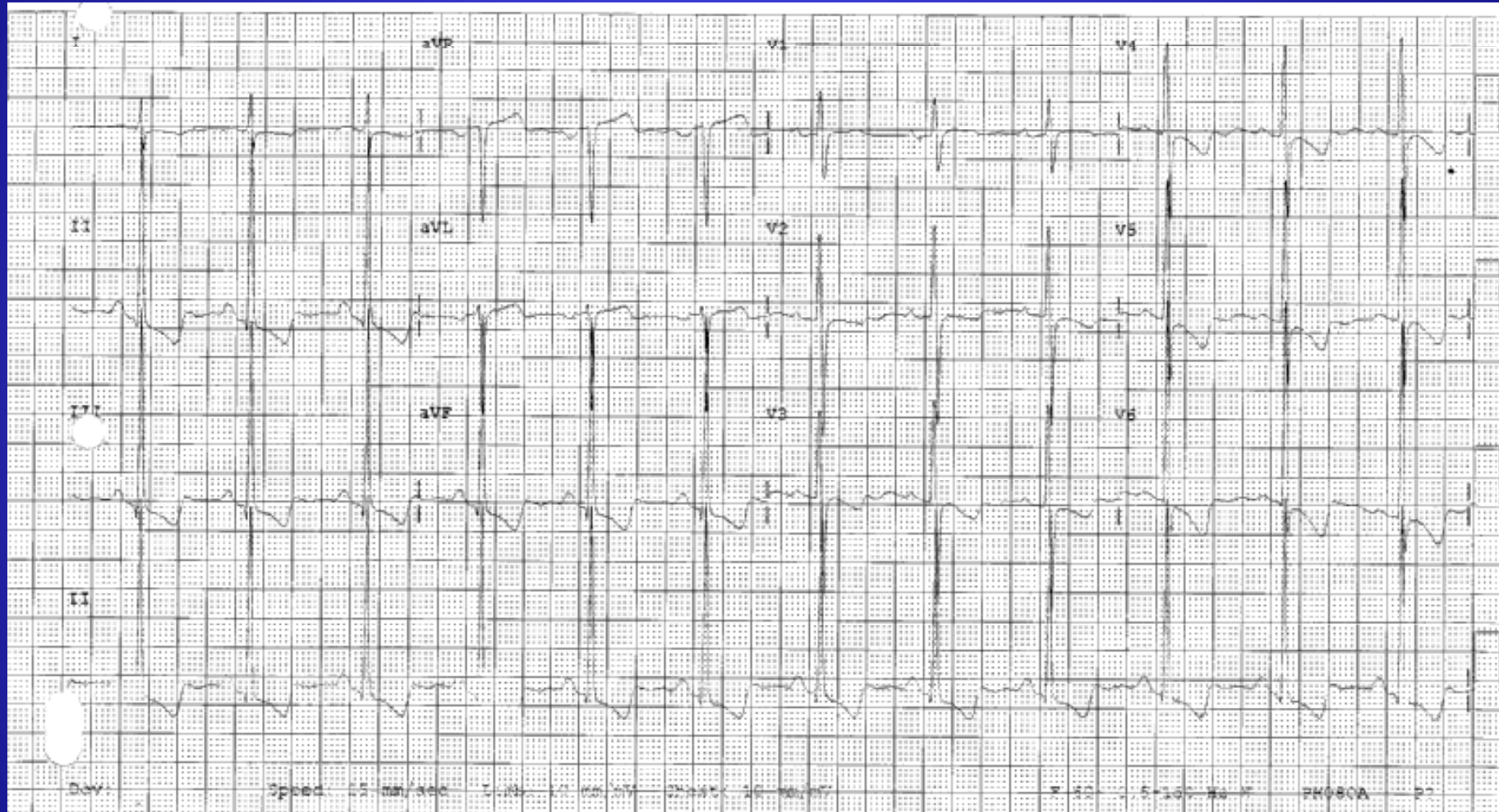
The purpose of this case

- Intravascular ultrasound (IVUS) is mainly used for coronary artery and it is easy to measure the accurate reference diameter of vessel.
- We planned transcatheter closure of PDA using intravascular ultrasound (IVUS) for accurate measurement of PDA size.

Clinical History and Physical Examination

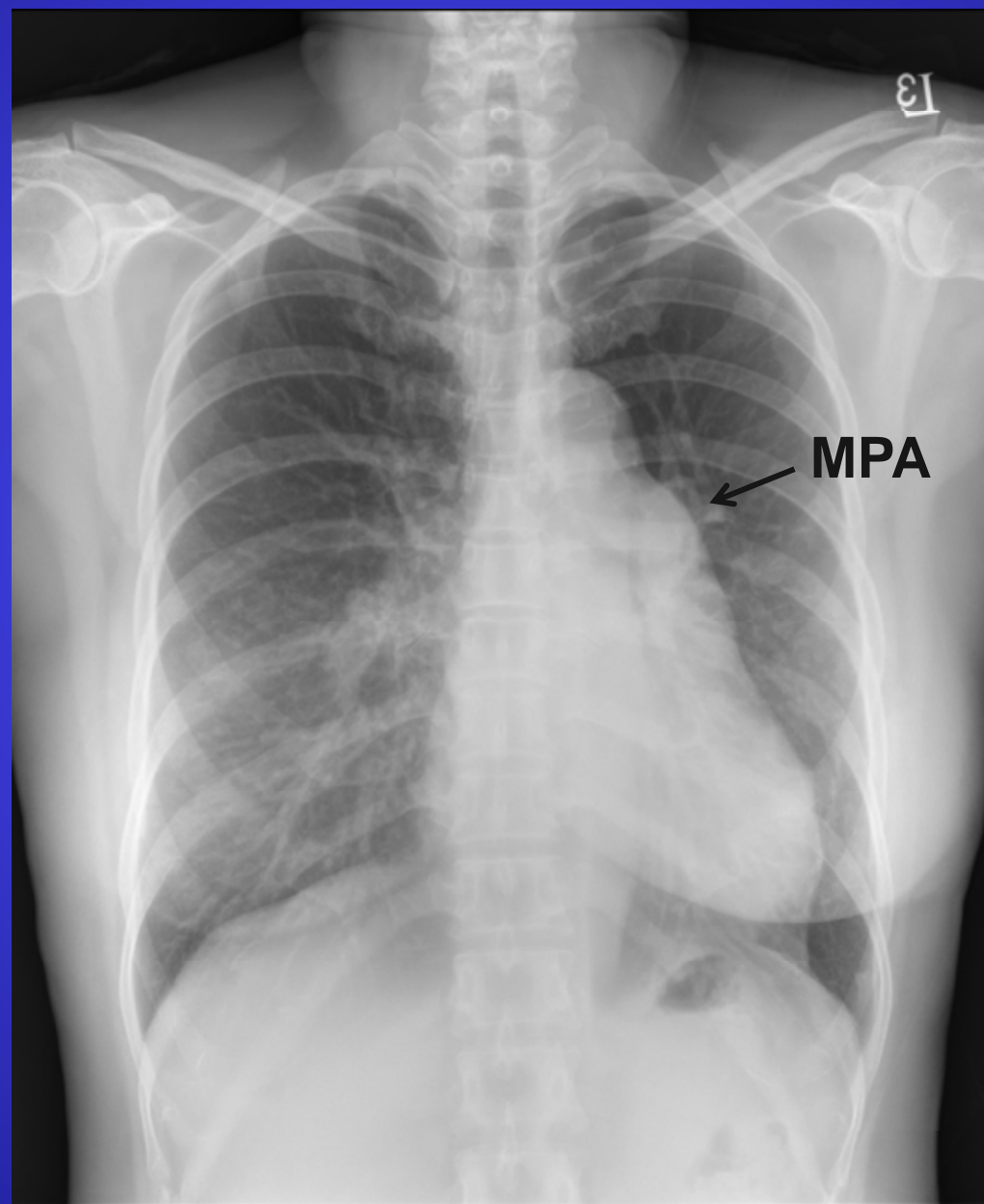
- A 49-year-old female
- C.C: palpitation & dyspnea
- Moderate grade pansystolic murmur
- Risk factor: She has heard that her heart has problem, but never performed for evaluating heart problem.
- ECG showed ST depression in lateral precordial lead I, aVL, V4,5,6.

Electrocardiography



- ECG showed ST depression and T wave inversion in lead II, III, aVF, V3- V6 & S wave in lead I.

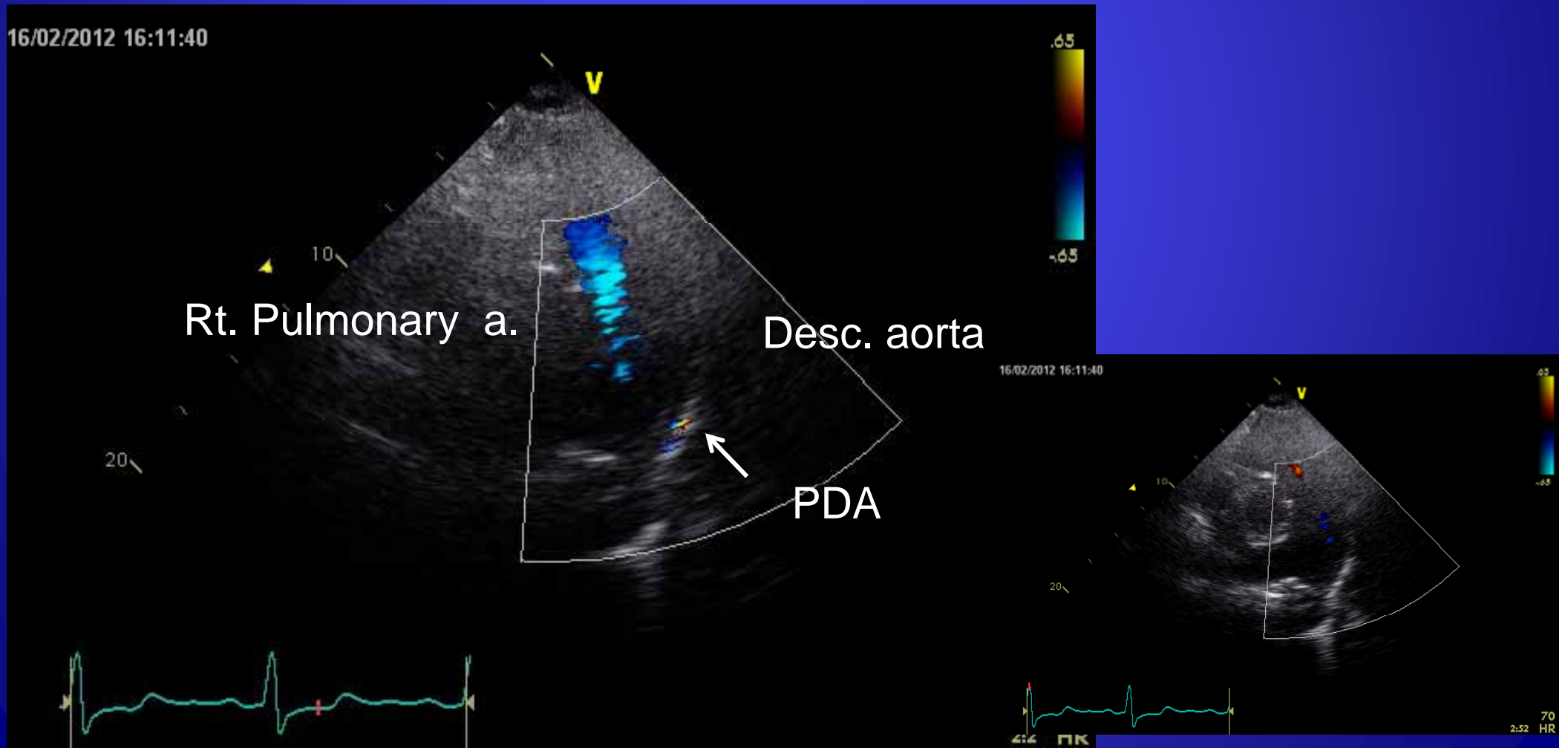
Chest X-ray



Enlarge MPA

Echocardiography

- Enlarged LA (LA volume index : 32.9 mm³/m²)
- Reduced LV systolic function (EF 53%)
- Moderated pulmonary hypertension (RVP 66mmHg)
- Small patent ductus arteriosus (PDA, PPG 61mmHg)



Cardiac Catheterization

- PDA has significant shunt ($Q_p/Q_s > 1.5$).

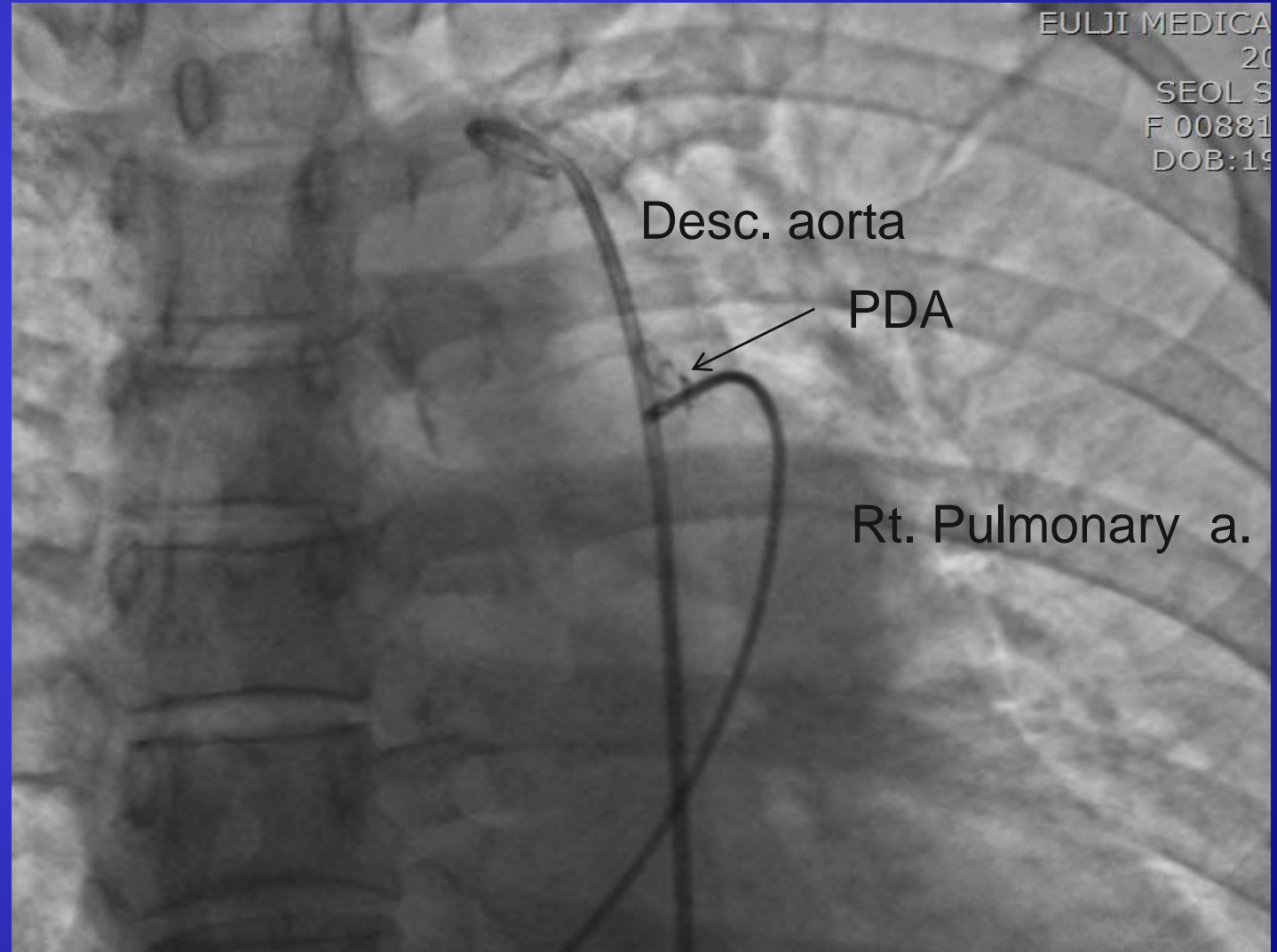
5Fr pig tail catheter was placed at the just starting point of descending aorta



Aortogram showed contrast media shift to pulmonary artery

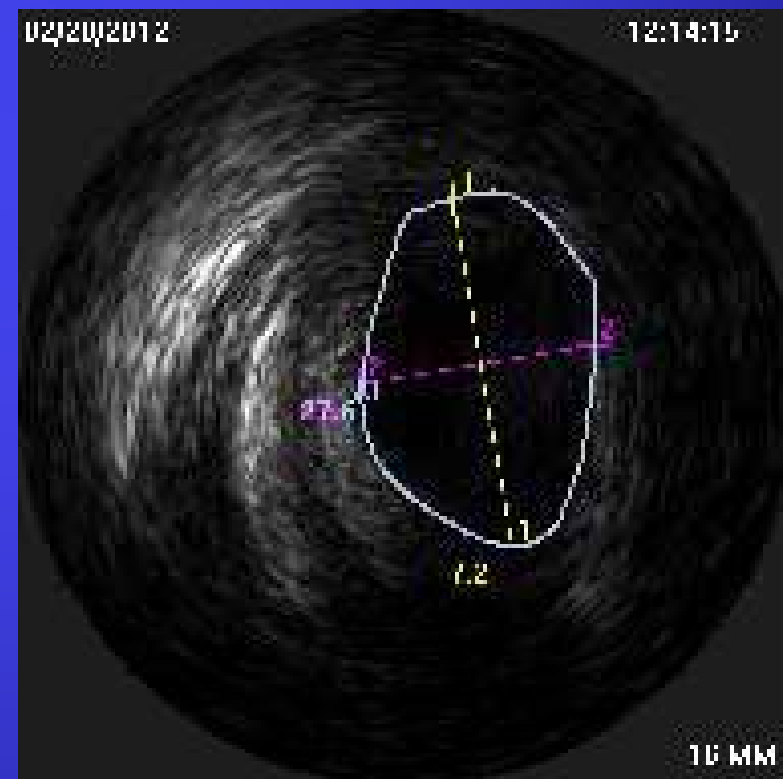
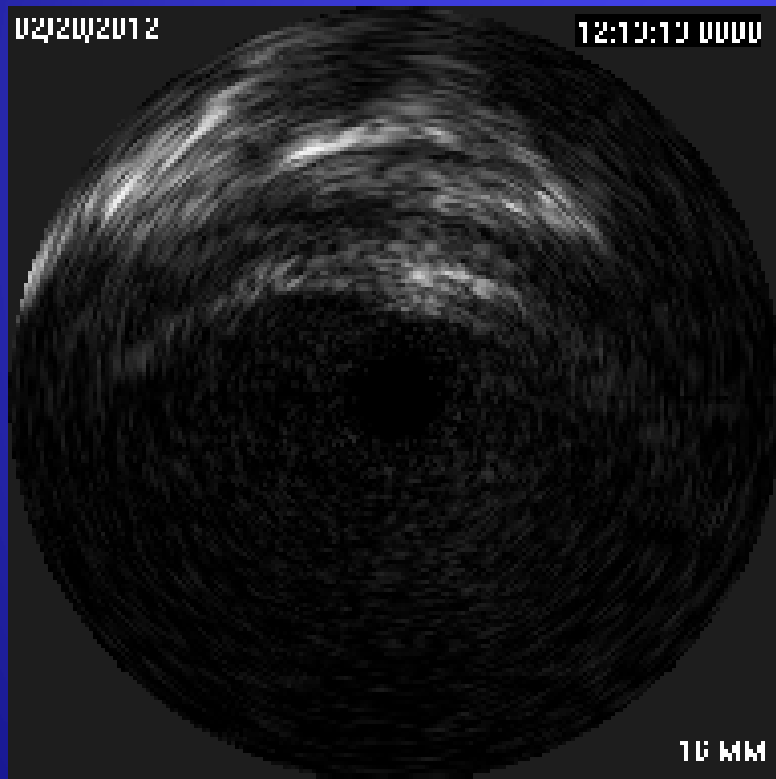


After 5Fr multipurpose catheter was placed in aorta through PDA, 035 Terumo long guide wire (G/W) was introduced to aorta through PDA along 5Fr multipurpose catheter.



IVUS findings

- We planned transcatheter closure of PDA using intravascular ultrasound (IVUS) for accurate measurement of PDA size.
- The ostium of PDA was oval shape and diameter was 7.5 x 5.1 mm.



PDA occlusion

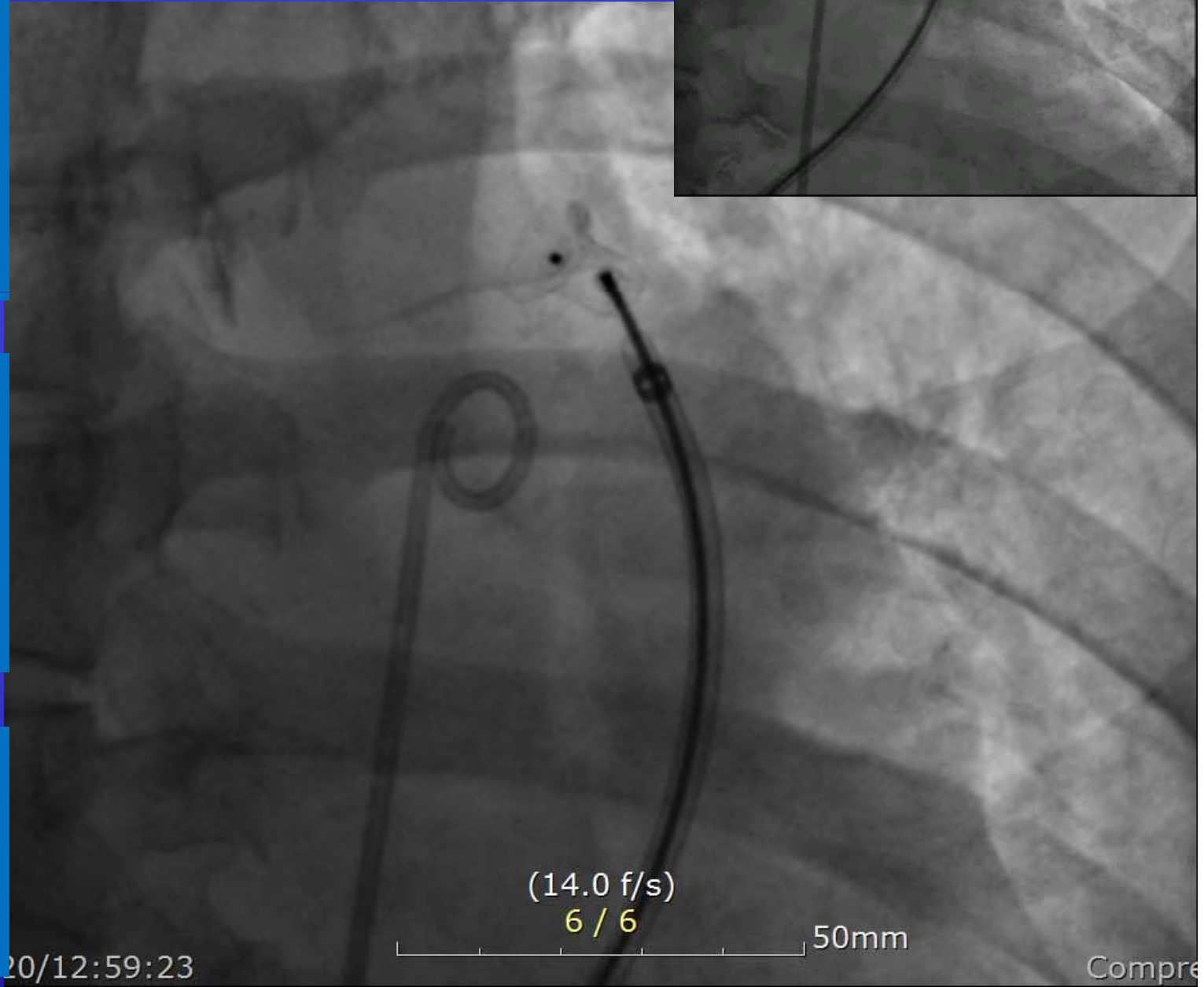
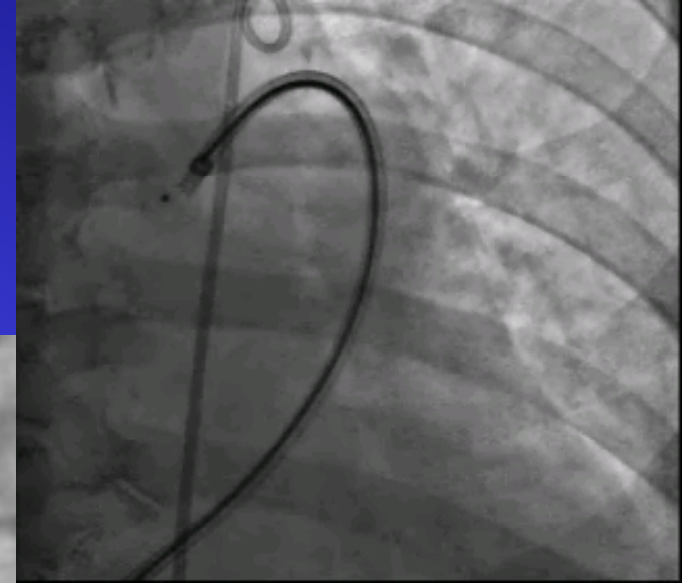
Long sheath was exchanged with 6Fr intravenous sheath and it was advanced to aorta through PDA with guidance of 035 Terumo long G/W.



Amplatzer Duct Occluder (8 x 6 mm/7 mm long) was deployed at PDA successfully with AmplatzerTorqVue 180 delivery system.



After deployment of duct occlude, shunt through PDA was significantly reduced.



Conclusion

- Accute defect sizing is crucial and mandatory for AMPLATZER Duct Occluder device selection.
- But, it is difficult to measure the exact size of shunt in the case of catheter procedure of congenital anomaly.
- Intravascular ultrasound (IVUS) is mainly used for coronary artery and it is easy to measure the accurate reference diameter of vessel.
- We planned transcatheter closure of PDA using intravascular ultrasound (IVUS) for accurate measurement of PDA size.

Conclusion

- In the present case, IVUS is feasible and helpful for observing the shape and measuring the exact size of PDA.
- If there were limitation to measuring the exact size of PDA, IVUS is a good choice to measure the correct size of PDA.

Thank you for your attention!