



**MEET** 2015  
MULTIDISCIPLINARY EUROPEAN  
ENDOVASCULAR THERAPY

# Three cases confirming the appropriateness of “centralization of flow concept” in aortic dissection

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## Disclosure

Speaker name:

Ivo Petrov

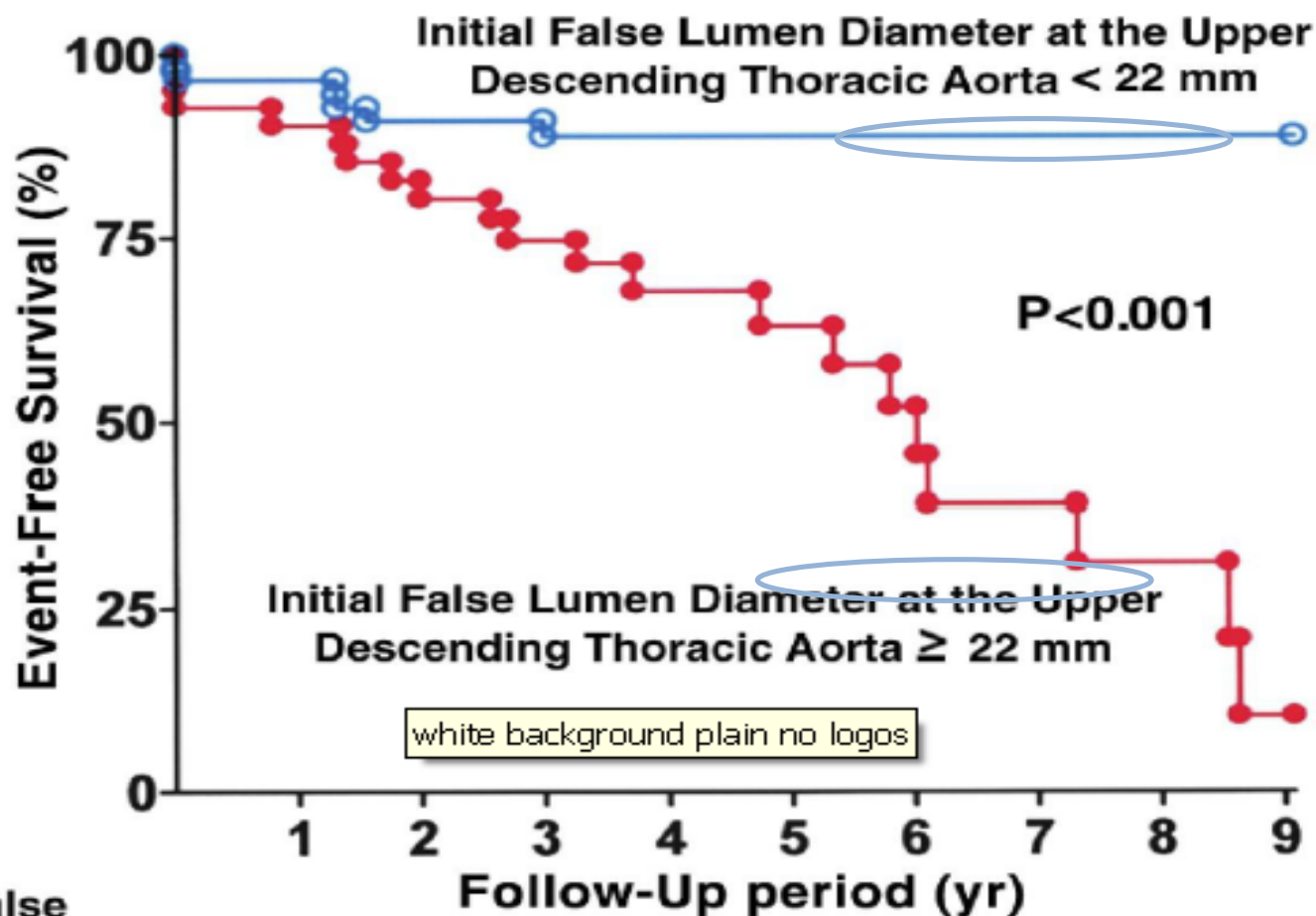
I do not have any potential conflict of interest

X



- Aortic dissection is a life threatening condition(mortality 1%/hour)
- Immediate surgical treatment is life saving
- Additional tears and critical true lumen compression and obliteration with end-organ ischemia can compromise acute and chronic clinical outcomes
- Restoration of flow in true lumen is crucial in such cases

# Event-Free Survival Curves



**Initial False Lumen Diameter**

< 22 mm 58

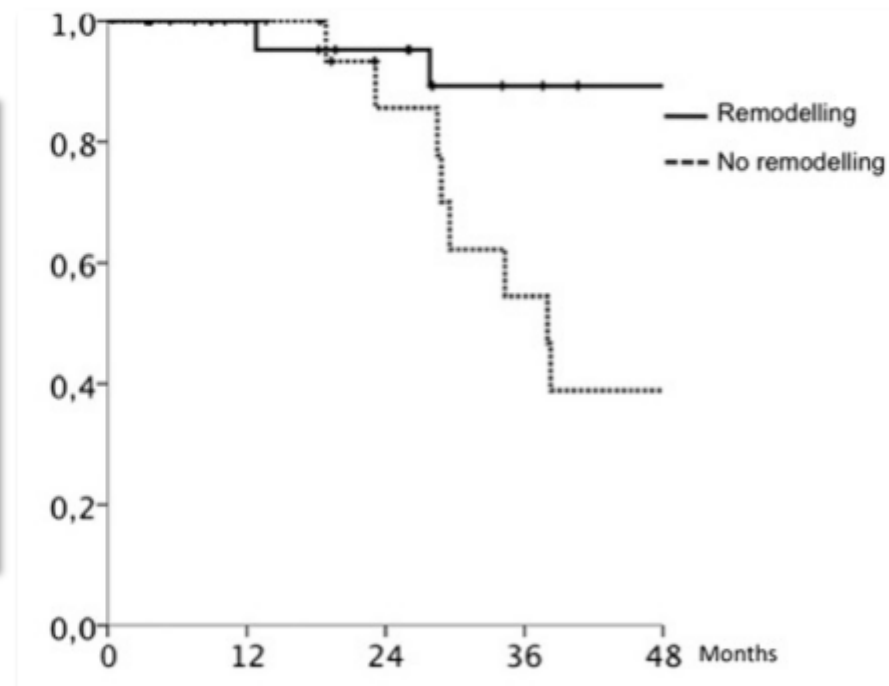
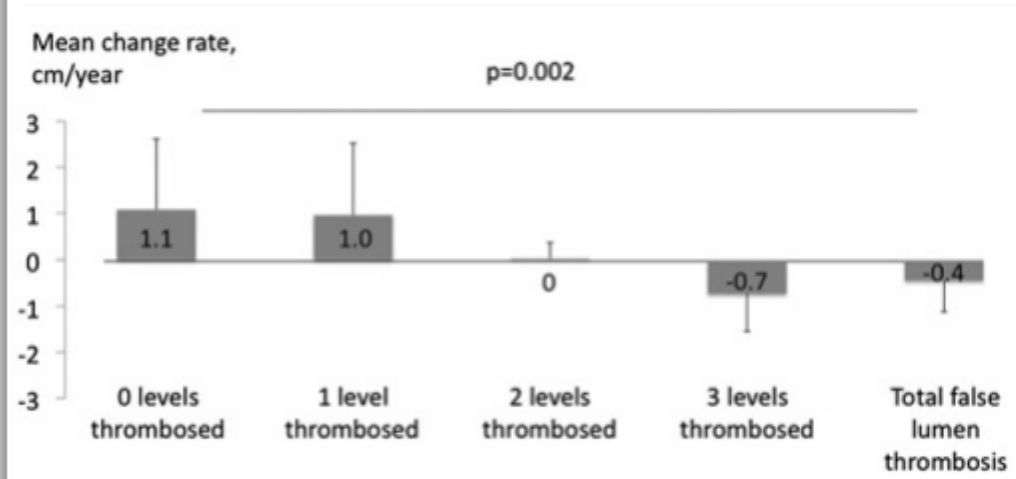
$\geq 22$  mm 42

**Patients at Risk**

< 22 mm 58 48 30 11 2

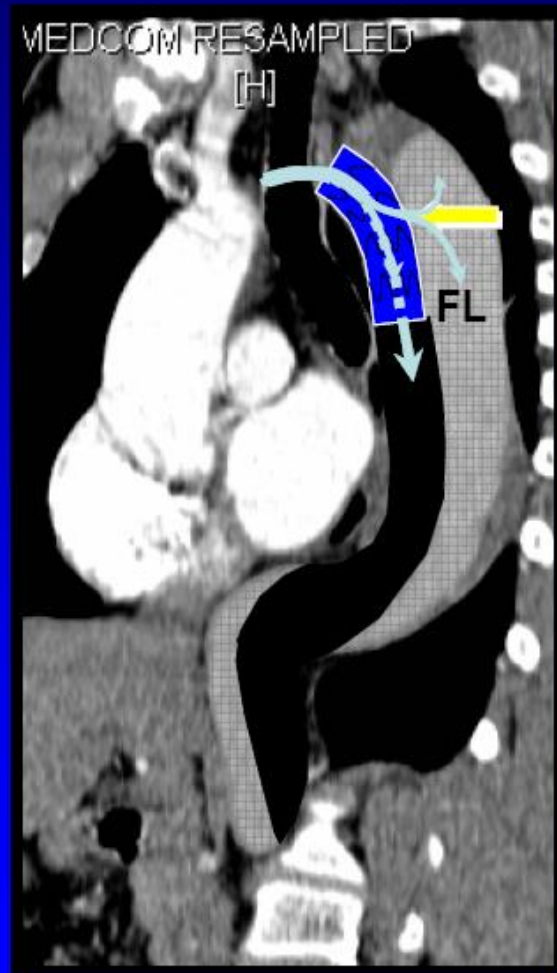
$\geq 22$  mm 42 32 17 8 3

## Aortic Remodelling, Aortic Expansion and Survival



Mani et al, 2012, JEVT

## Concept of Endovascular Repair in Aortic Dissection



- Closure of the proximal entry tear
- Depressurization of the false lumen
- Thrombosis of FL
- Redirection of blood flow towards TL
- Induction of „aortic remodeling“

- We present 3 cases of life saving endovascular treatment using different devices but with the same strategic goal (centralization of flow and restoration of end-organ perfusion) in cases of acute and chronic Aortic dissection

# Individual experience TEVAR (2002- 2014)

93 patients (54males, 34 females)

Mean age	67.7%
Mortality	3.2% (3 pts)
Proximal redissection	2.2% (2 pts)
Stent migration	2.2% (2 pts)
Cardiatis multilayer	3.2% (3pts)
Hybrid repair	2,2%(2 pts)

# Case 1 (12 years f-up)

- Year 2002: D.S. 54 -year- old male
- Clinical history:
  - ✓ 10-year history of arterial hypertension
  - ✓ Smoker
  - ✓ 6- year history of Diabetes mellitus
- ✓ Admitted in critical clinical condition (hypotensive, anuric, unconscious, in pulmonary edema)
- ✓ Acute De Bakey type I aortic dissection and AoReg III degr. was diagnosed

Urgent surgical resection of the ascending aorta with Unigraft No30 implantation was done

**2002**

## **CLINICAL COURSE:**

**In the immediate post operative period the patient remained in critical condition:**

**anuria**

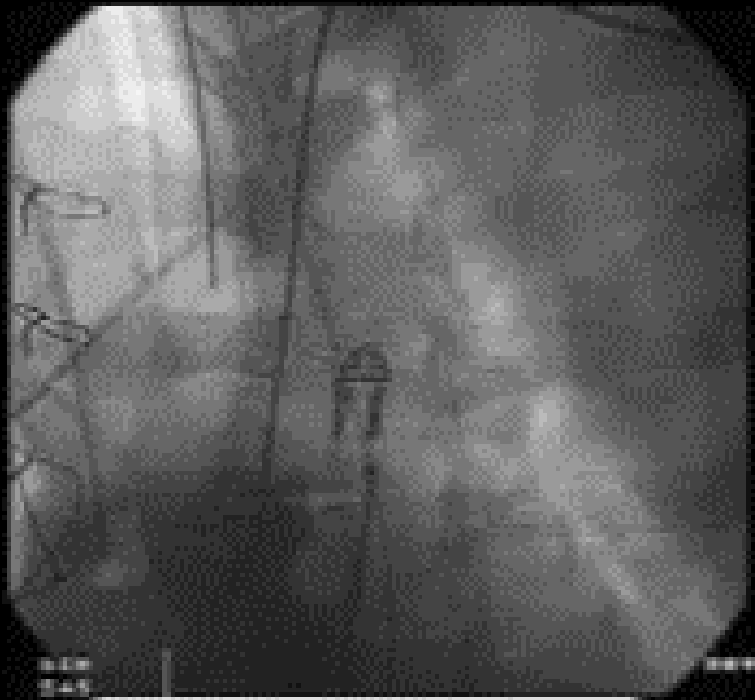
**ileus,**

**inferior limbs paraparesis**

**livedo reticularis of the lumbal area and extremities.**

## Aortography (left radial approach)(July 2002):

- Multiple additional tears in the thoracoabdominal aorta causing false lumen expansion and true lumen compression resulting in life threatening end organ ischemia

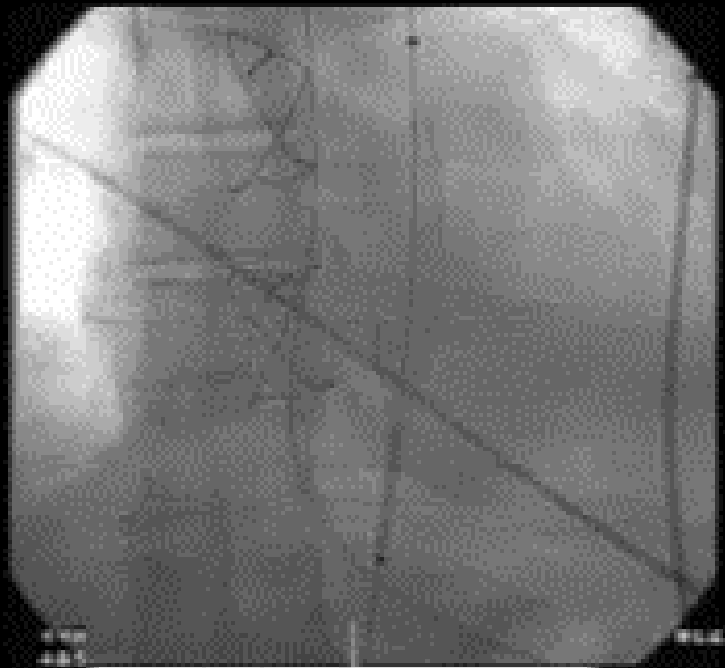


## **Applied strategy in 2002:**

Percutaneous implantation of a non covered self expandable stents with the purpose:

- **To centralize the blood flow allowing normal blood flow for the abdominal branches through the struts of the non-covered stent**
- **To compress the false lumen**
- **To decrease and slow down the flow in the false lumen with aimed final result- "healing" thrombosis of the false lumen**
- **Minimal trauma and periprocedural risk**

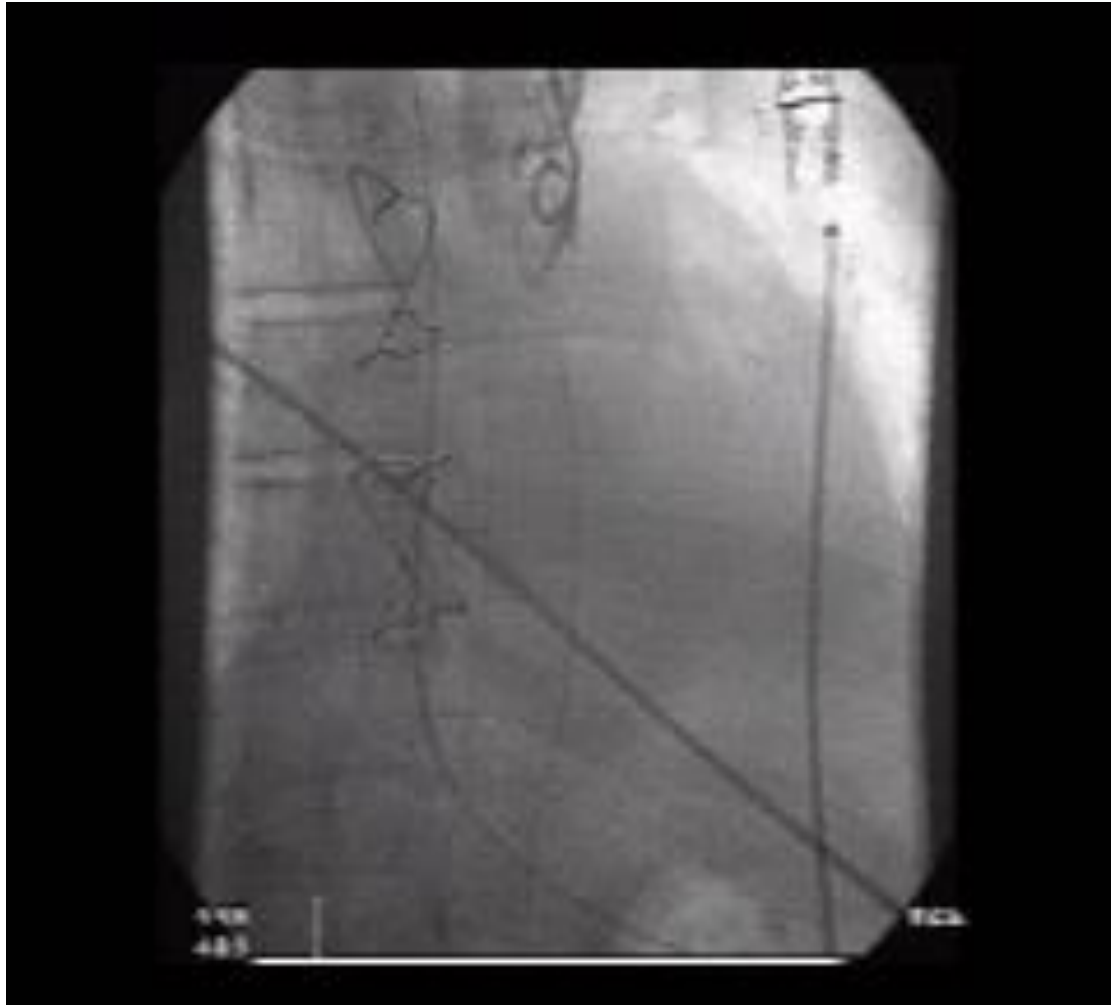
- Implantation of two Wallstents 20x55mm, followed by postdilation with balloon Symmetry 18x40mm, 6 atm.
- Femoral approach was used to deliver the stents and left radial approach for angiographic control and left subclavian artery marking.



# Final result (2002)

- Restored and centralized true lumen flow
- Restored abdominal branches flow
- Decreased flow in the false lumen

True lumen expansion

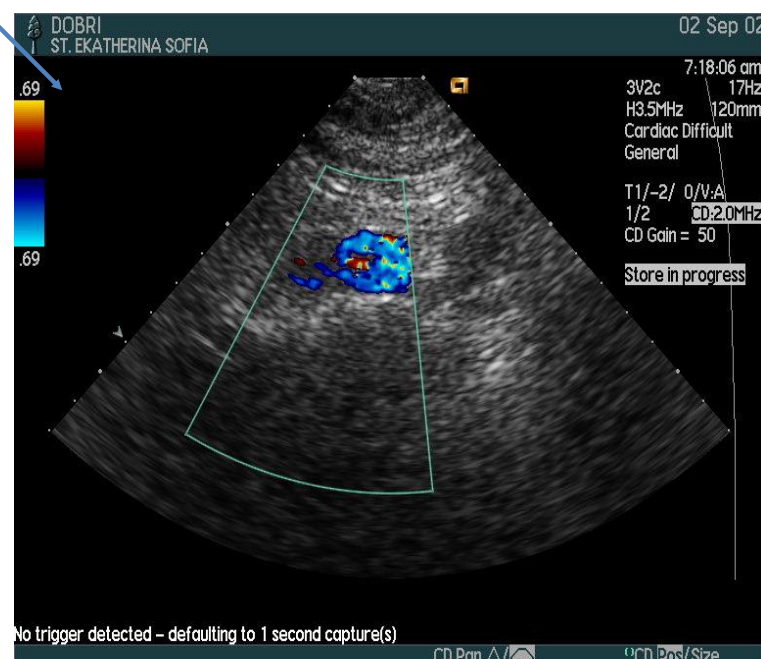
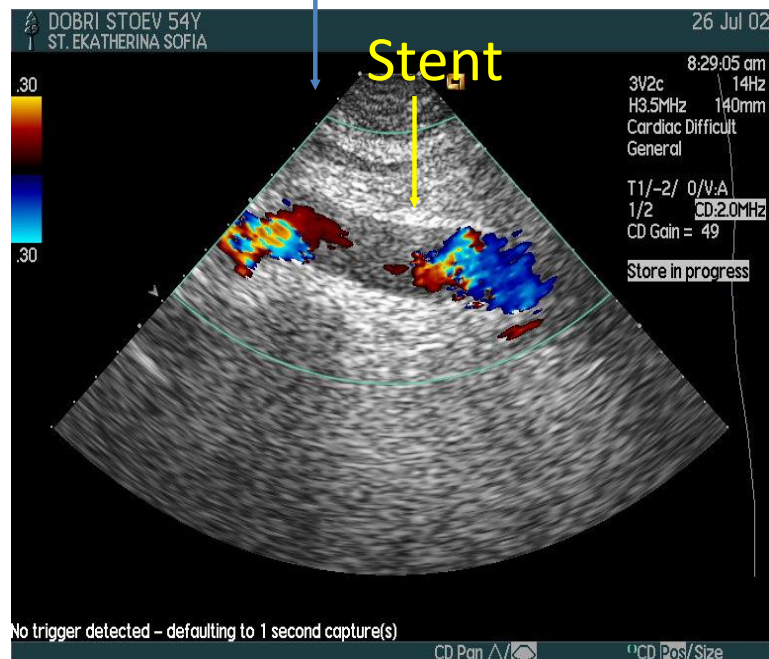
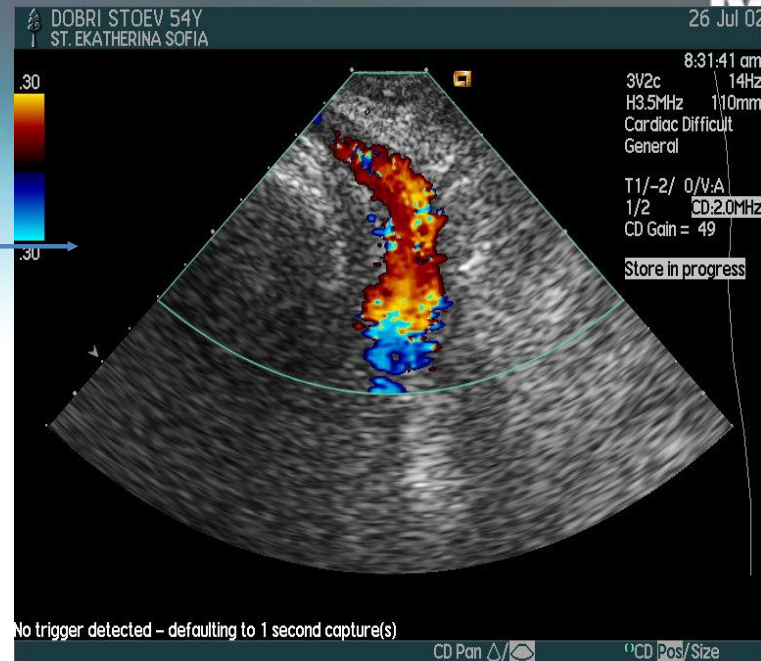


# **CLINICAL COURSE**

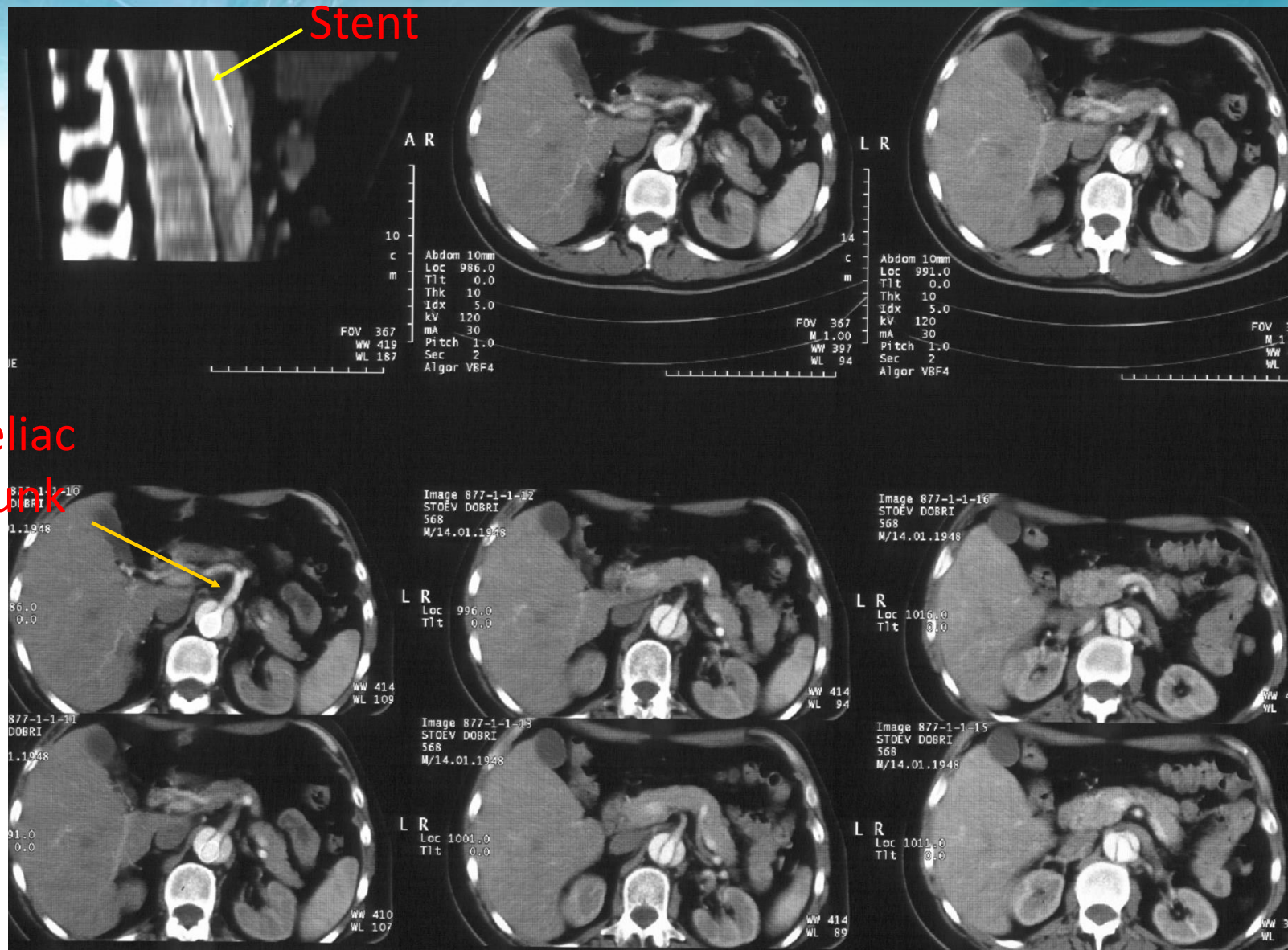
- 1. Immediate hemodynamic stabilization**
- 2. Recovery of renal function immediately after the procedure with a diuresis of 1500 ml for the first hour.**
- 3. Gradual recovery of the bowel function.**
- 4. Complete recovery of the lower extremities' pulses bilaterally and resolving of the livedo reticularis.**
- 5. Discharged on the 13<sup>th</sup> post-procedural day after rehabilitation and complete functional recovery.**

Next day Follow up  
ultrasound  
Thoracic Ao

Abdominal Ao



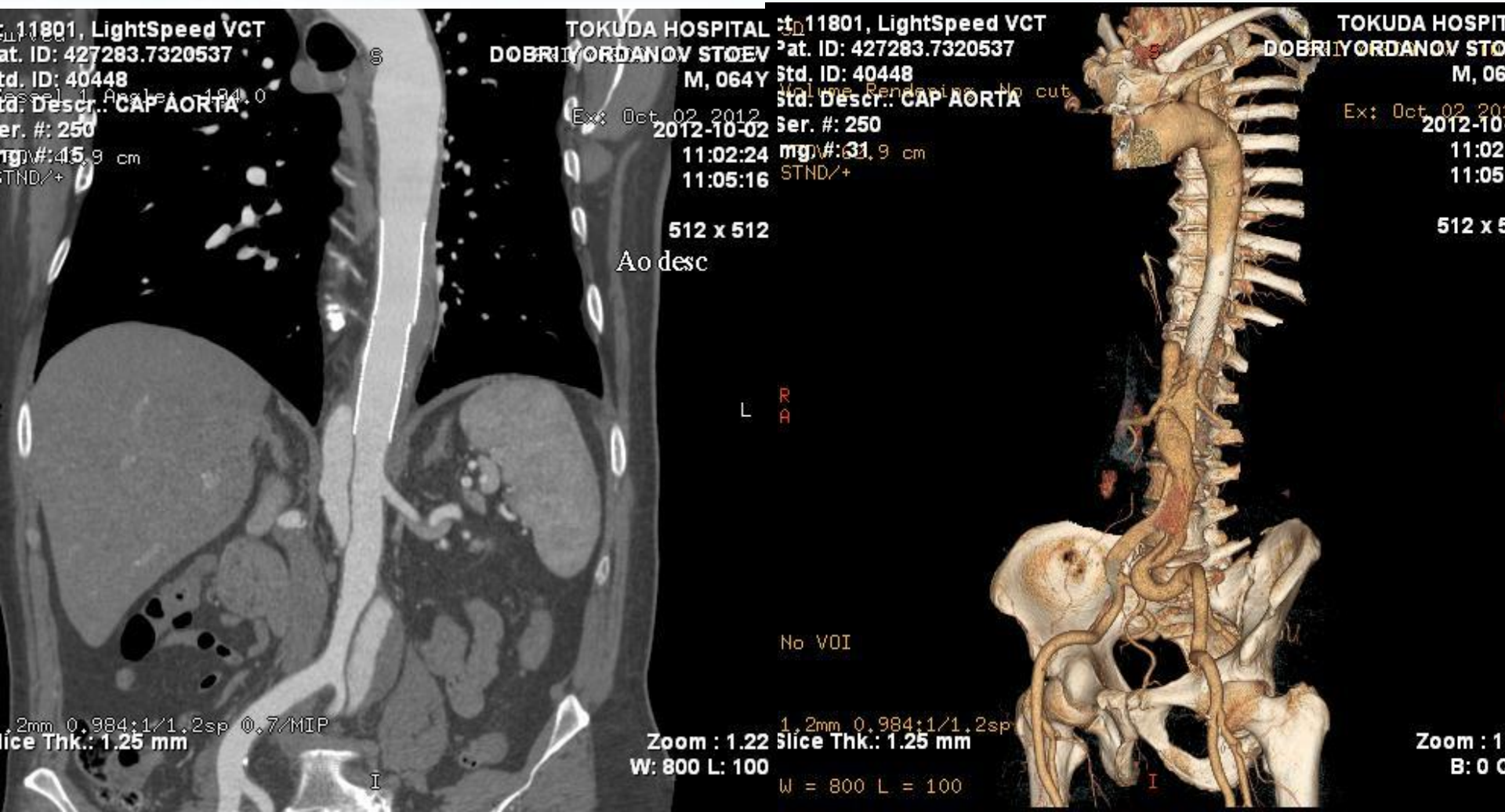
# Abdominal Ao CT-scan



.....10 years later:

- 2012: Uneventful 10 years follow-up,
- Normal renal function
- Normal ABI, the patient 66 y of age still working

# 10 years MSCT- angio follow up



# Conclusion

Blood flow centralization with uncovered overlapping stents in this critically ill patient resulted life saving and durable because it succeeded to:

1. Centralize the true lumen flow
2. Isolate and prevent late expansion of the false lumen
3. Preserve the flow in the branches involved in the dissected segment

# Case 2

- P.I 57 -year- old female
- Clinical history:
  - ✓ 10-year history of arterial hypertension
  - ✓ 2009

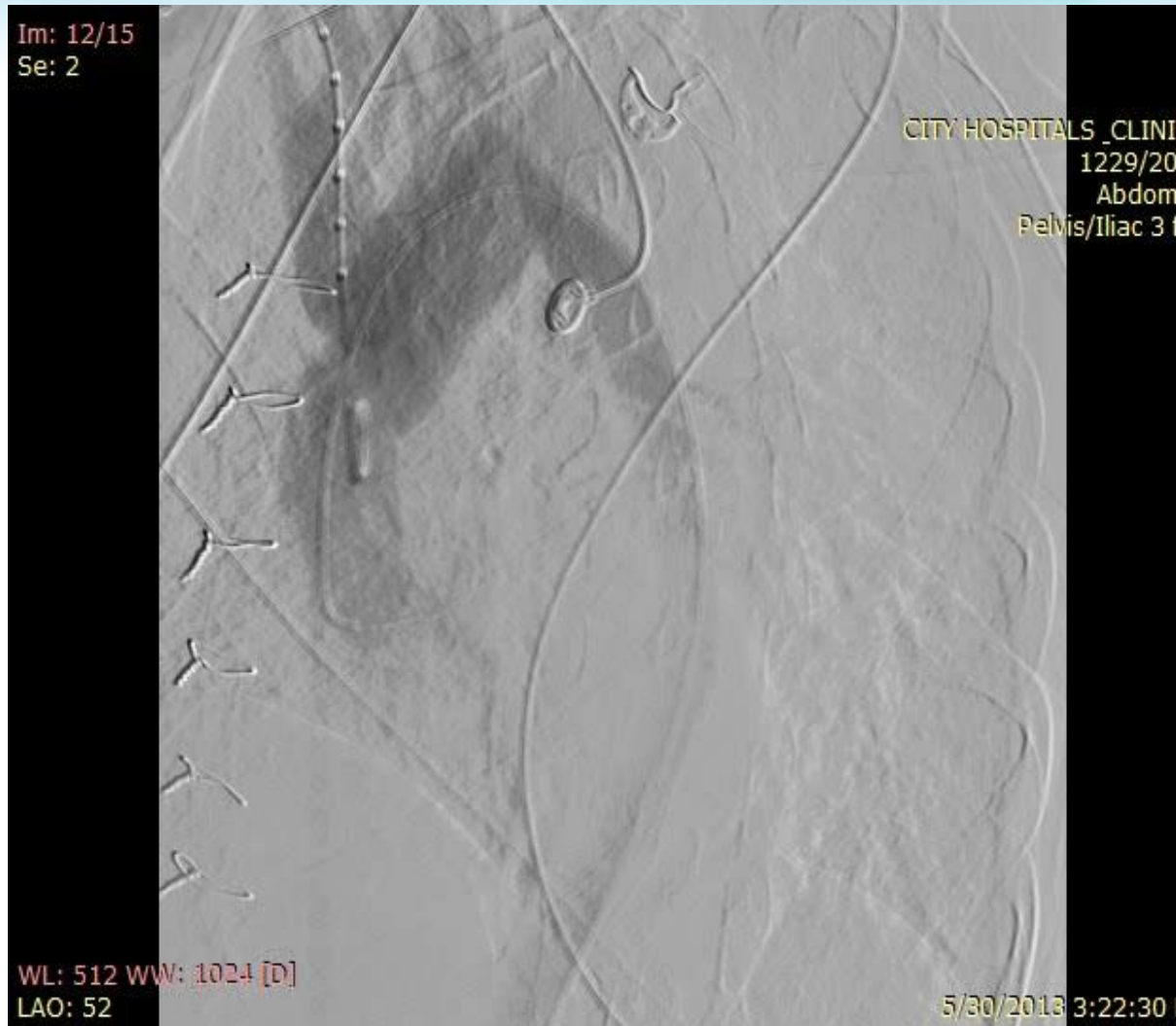
Acute De Bakey type I aortic dissection was diagnosed  
 Urgent surgical treatment Albograft No 26 implantation

- ✓ In last 6 months , admitted with dramatic chest pain and shortness of breath
- ✓ Contrast MSCT- ThAo disecation aneurysm with 9 cm diameter, entry point in the arch compression of the true lumen

## CT- aortography



## Aortography



# Repair solution

1. Hybrid repair with surgical debranching and implantation of the stent-graft
- 2 .Implantation of an uncovered stent crossover all the arch branches ("uncovered elephant trunk")

# Implantation of the uncovered stent:

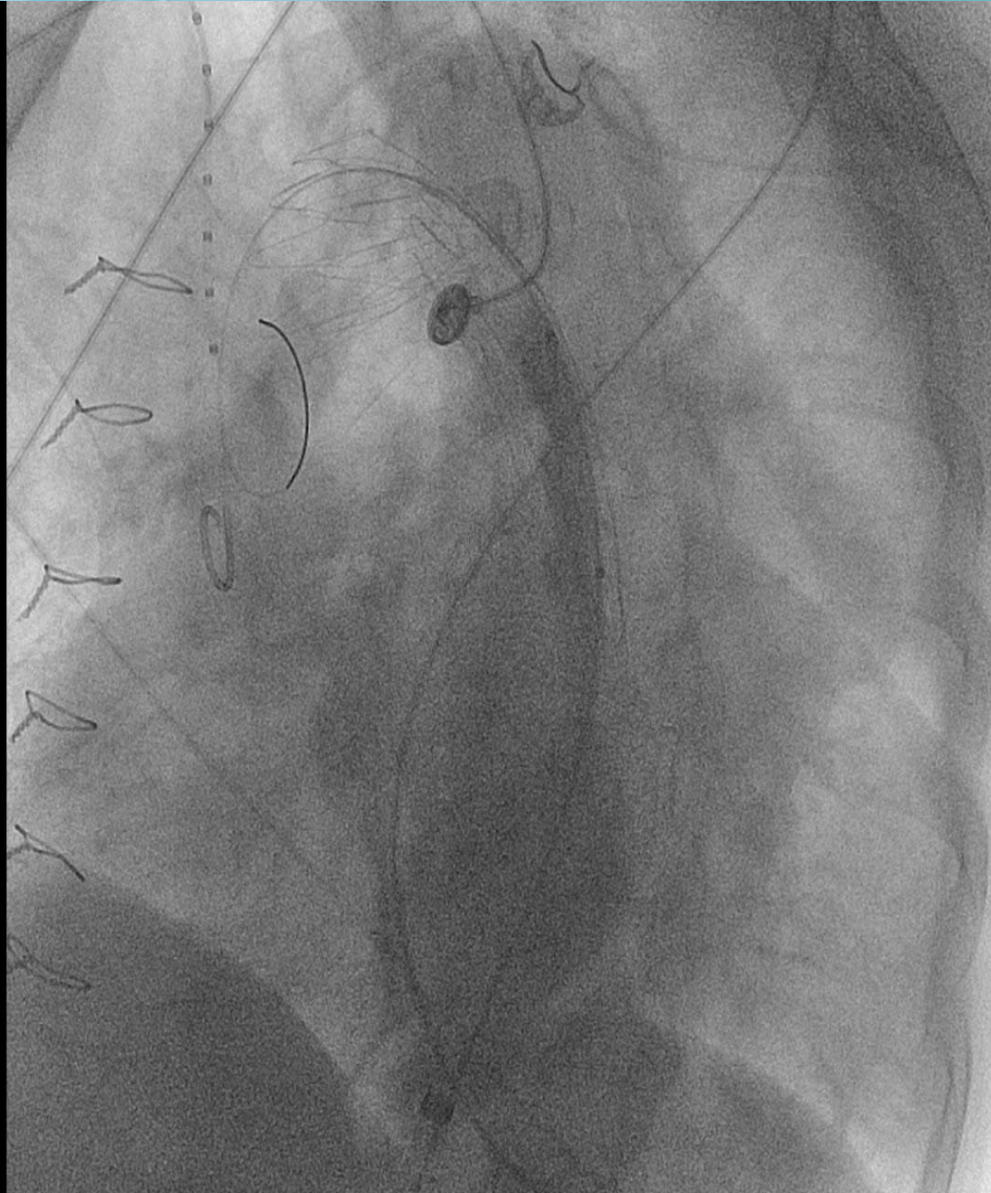
- Decompression of the true lumen
- Centralization of the blood flow
- Reduce the pressure in the aneurysm
- Preserve the flow in the branches

# Implantation Zenith Dissection 36mm/123mm open cell thoracic stent



# Post dilatation (true lumen molding)

Im: 1/101  
Se: 8



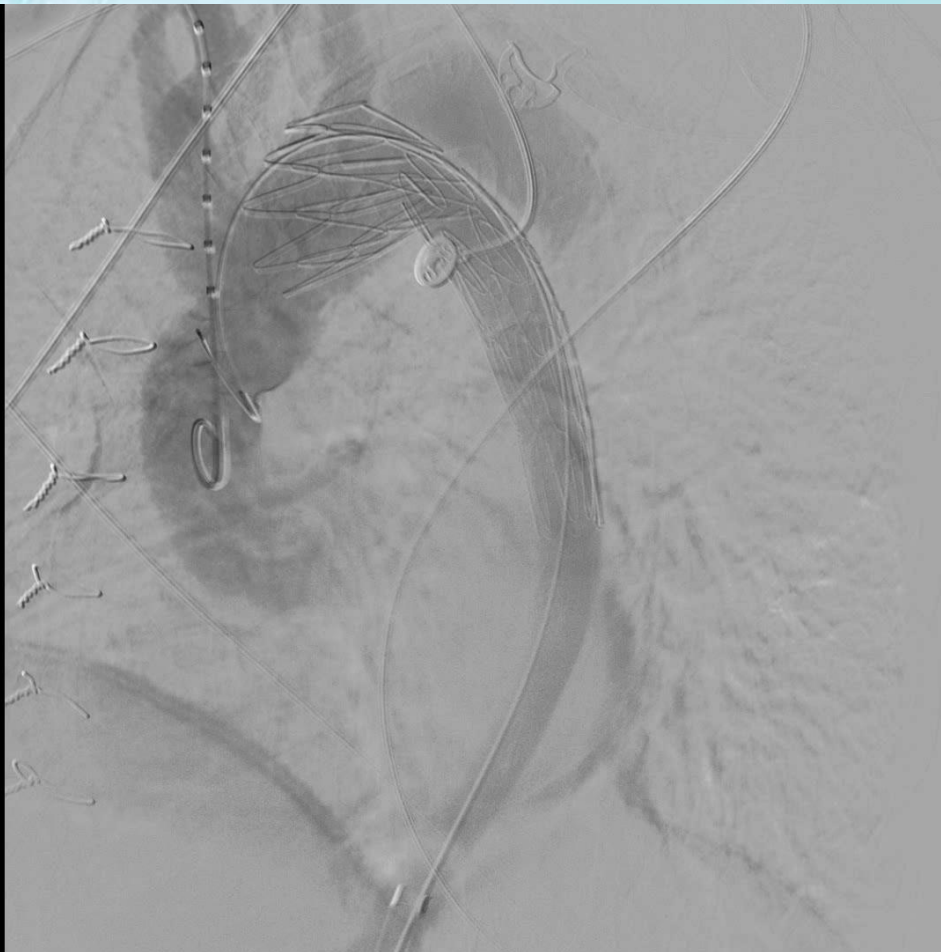
CITY HOSPITALS \_CLINICS  
1229/2013  
Abdomen  
Fluoroscopy

WL: 560 WW: 706 [D]  
LAO: 52

5/30/2013 3:34:11 PM

# Final

Im: 13/16  
Se: 10



CITY HOSPITALS \_CLINICS  
1229/2013  
Abdomen  
Pelvis/Iliac 3 fps

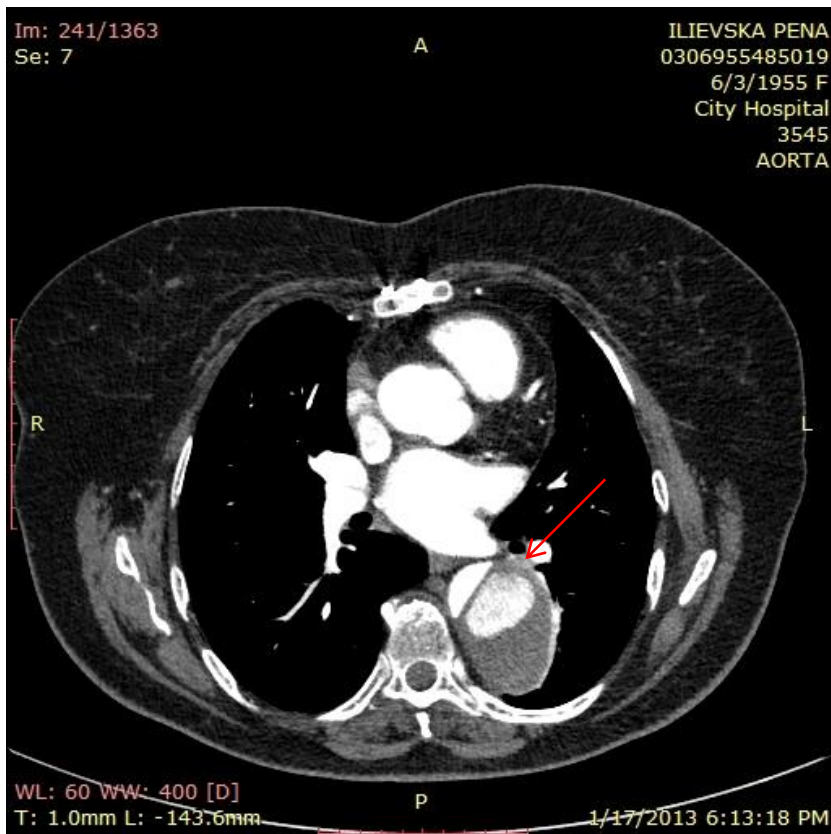
WL: 512 WW: 1024 [D]  
LAO: 52

5/30/2013 3:36:09 PM

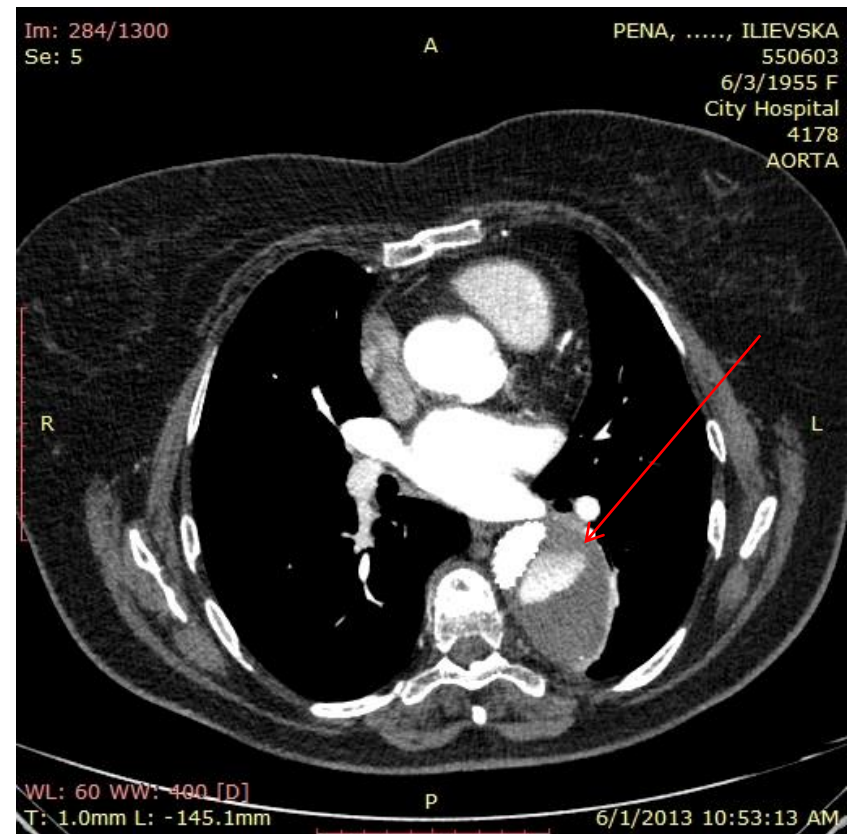
# Result

True lumen better expanded  
False lumen not increased

**Before**



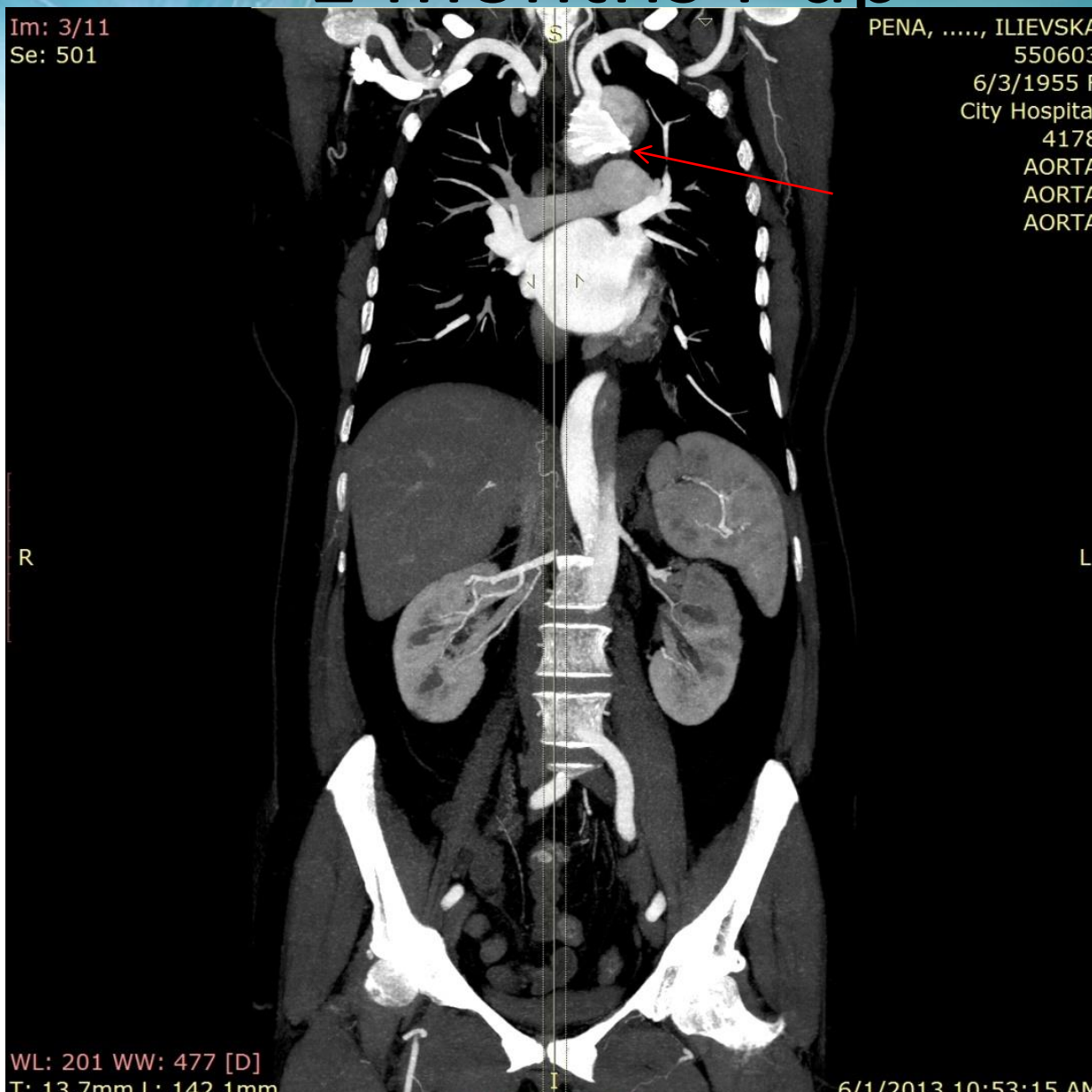
**1 months f-up**



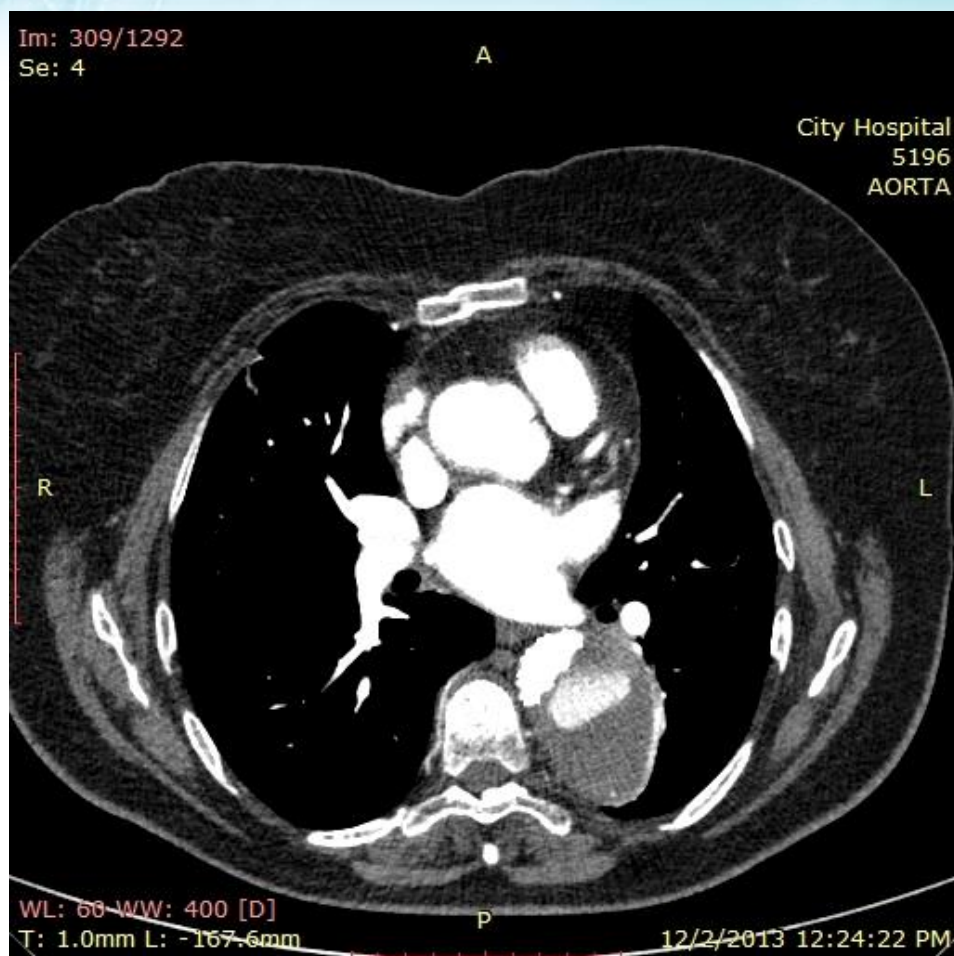
# 1 months f-up

Im: 3/11  
Se: 501

PENA, ....., ILIEVSKA  
550603  
6/3/1955 F  
City Hospital  
4178  
AORTA  
AORTA  
AORTA



# 6 months f-up



Before and 6 months f-up

True lumen expansion

Normal parallel flow both in true and false lumen

Patient asymptomatic



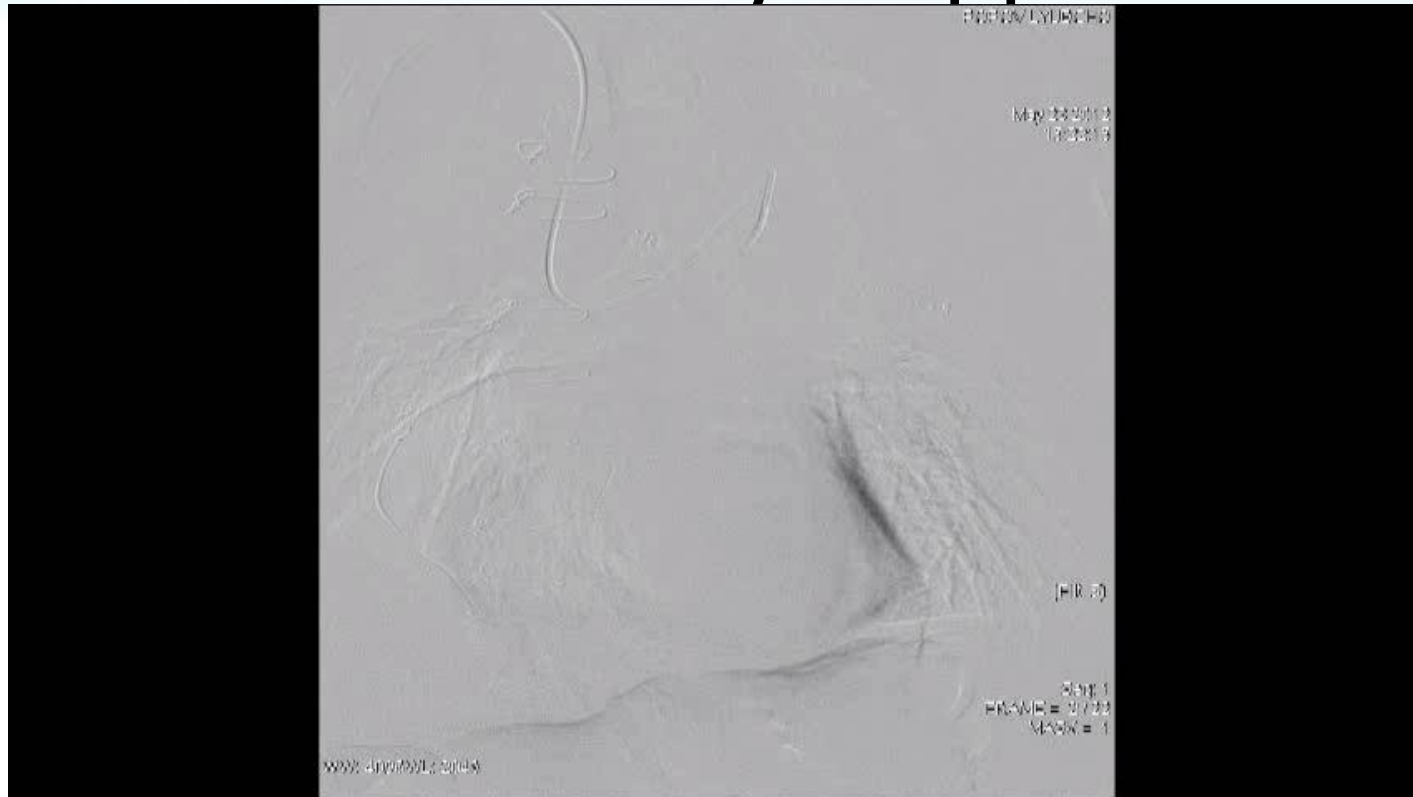
# Case report 3

- White male 71 yo
- Admitted in hospital with persistent severe abdominal and peripheral ischemia with abdominal angina.
- History of pervious surgical treatment for Type A Ao dissection

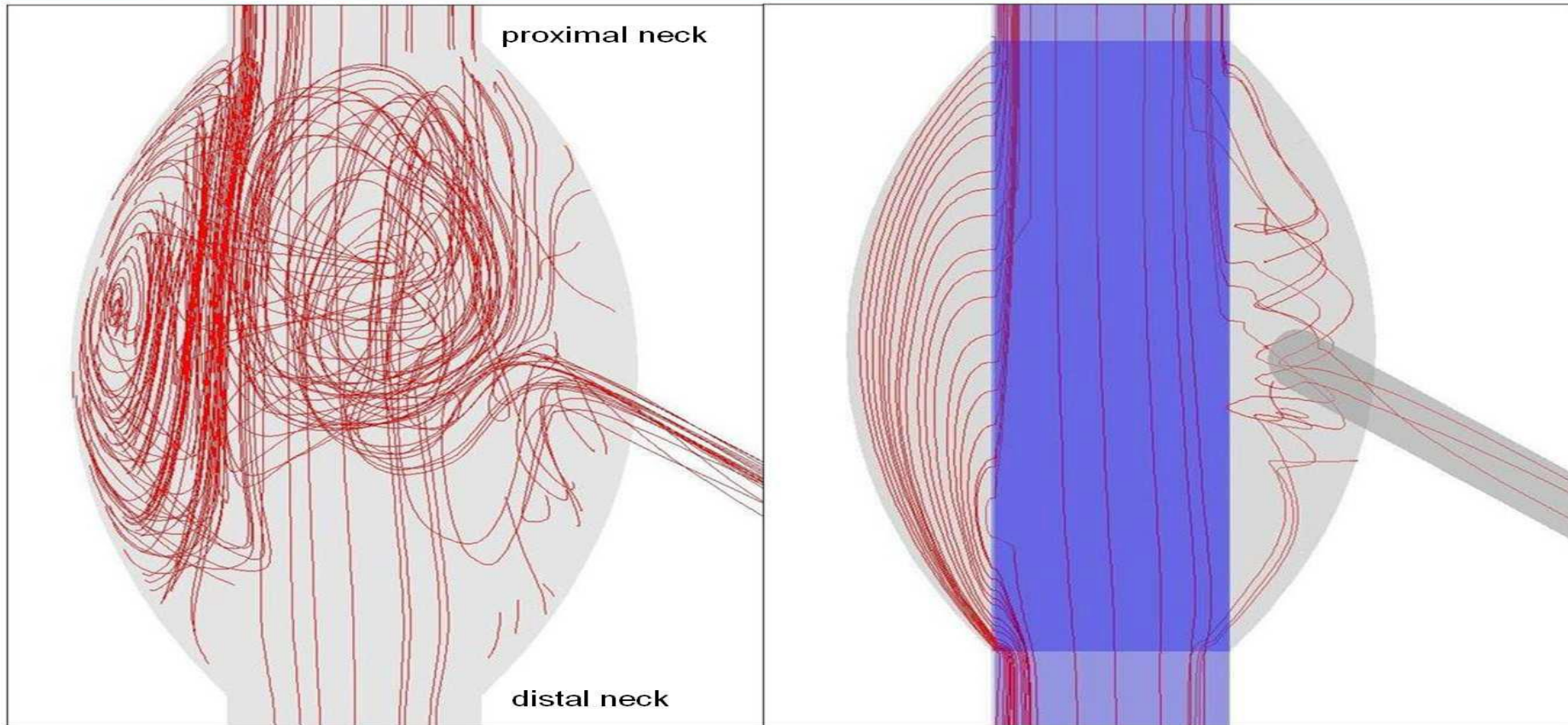
Diagnostic angiogram

Subocclusive true lumen compression

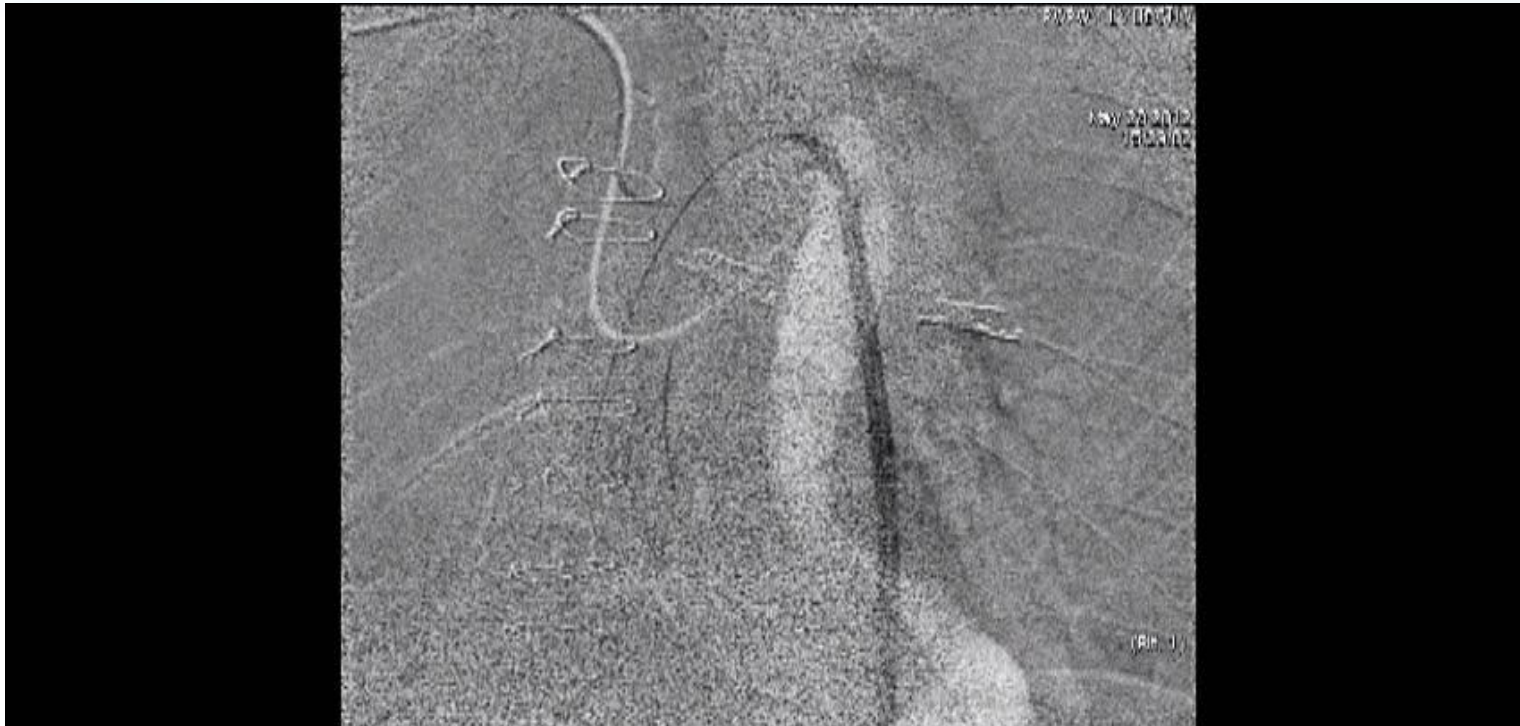
Visceral flow totally stopped



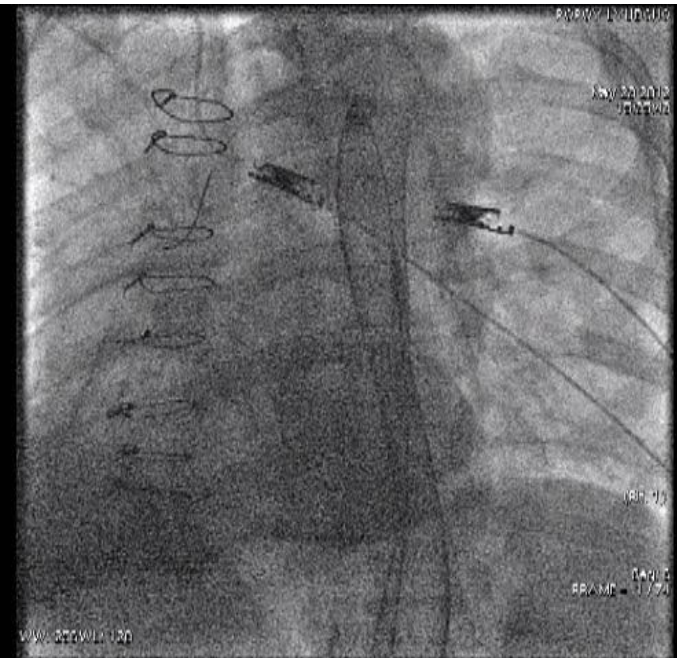
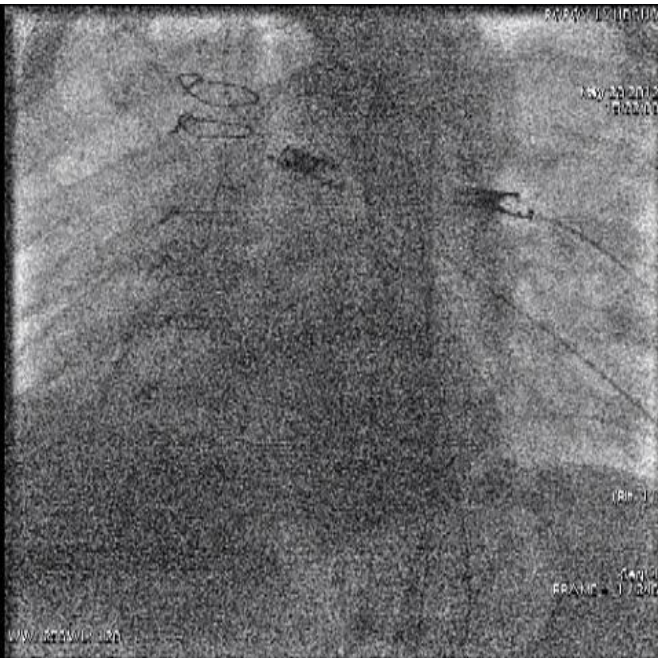
Streamlines inside an aneurysm without stent(left) and with porous wired stent (right, stent in blue). Steady computation.



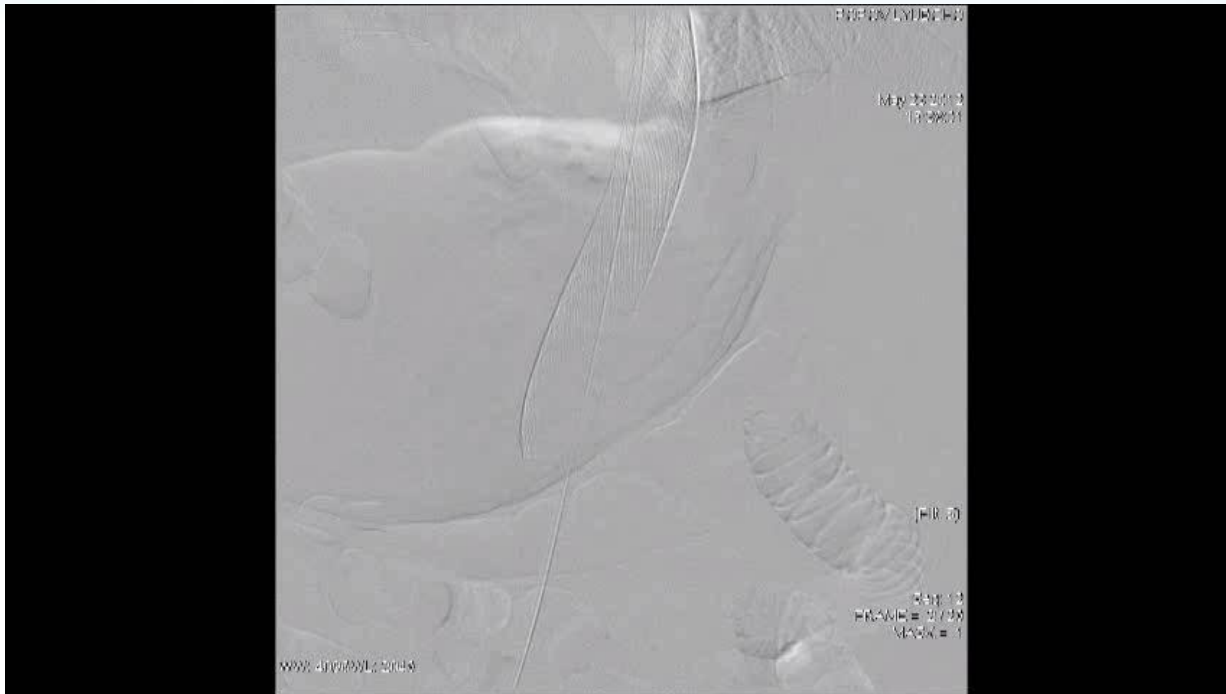
# Cardiatis MFM 1 st Stent implantation



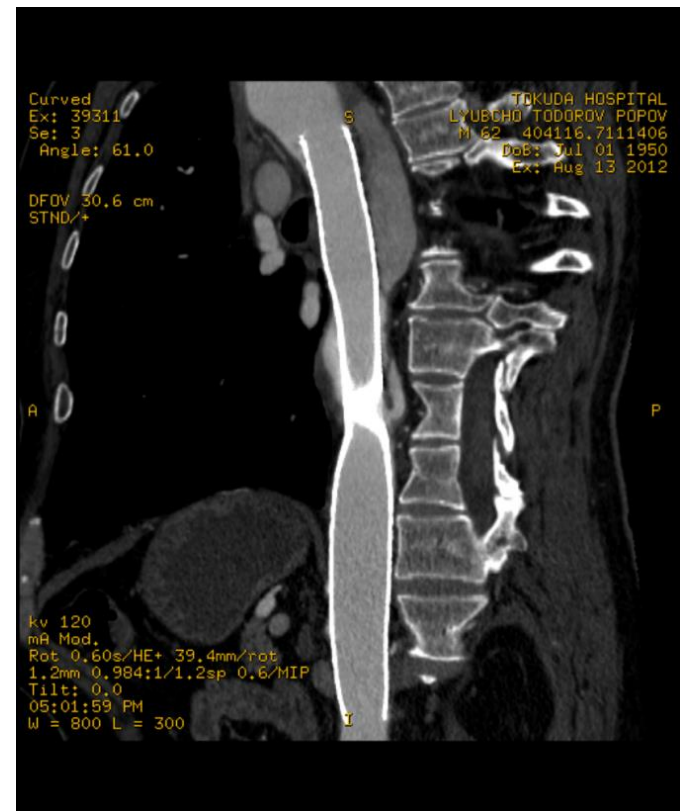
# Postdilatation



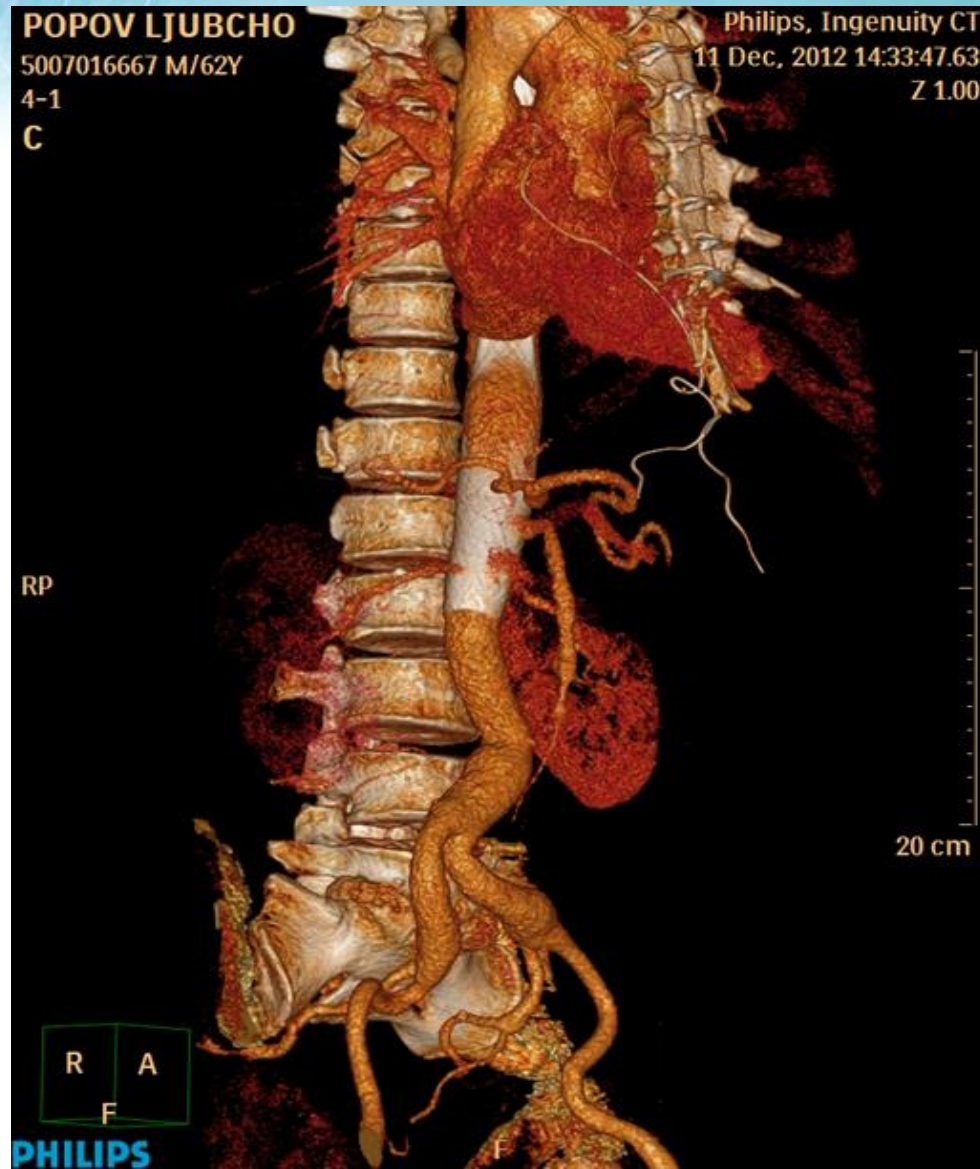
# Final result after Cardiatis MFM implantation



# CT- angio after 2- months



CT- angio after 6- months. Centralized blood flow.  
Complete distal healing, patent visceral vessels:

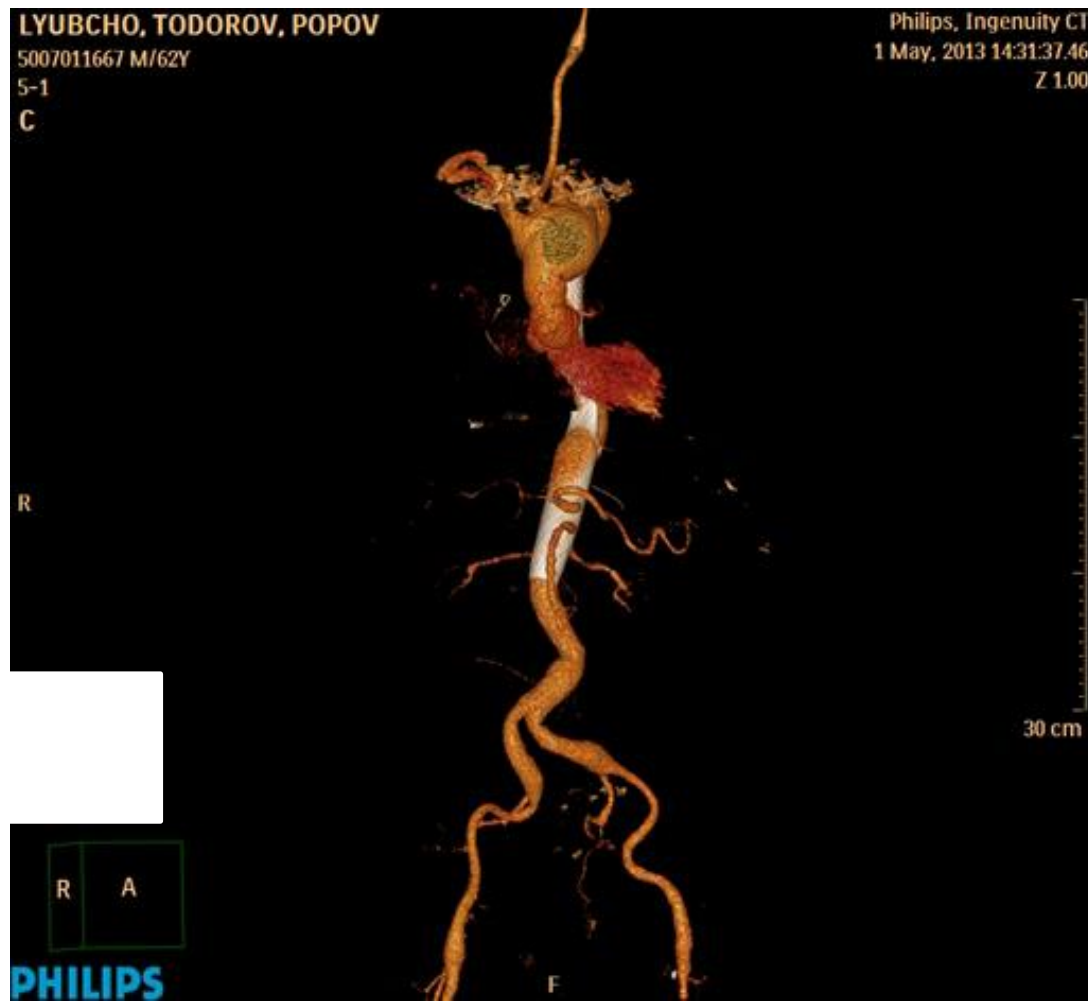


CT- angio after 12 months:

Flow in the true lumen restored

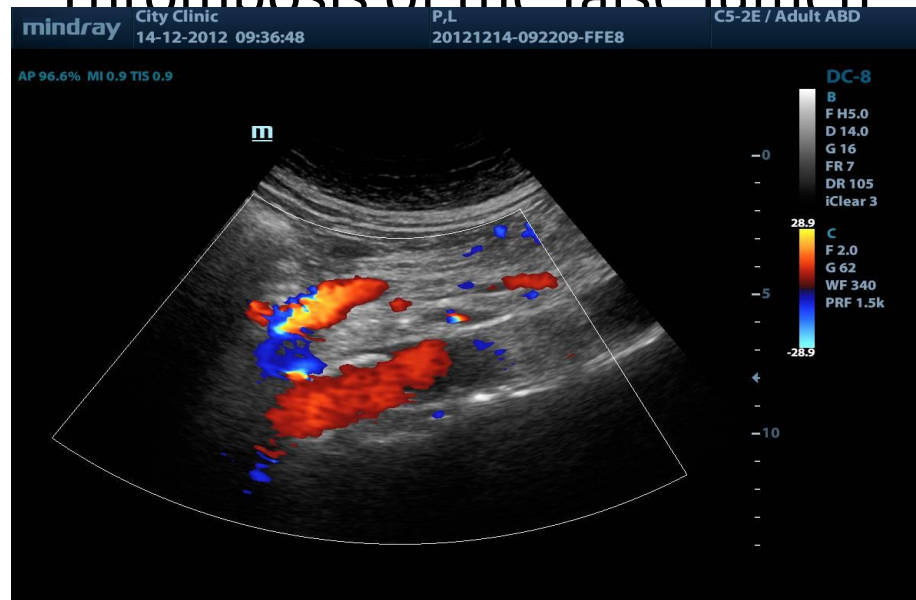
False lumen patent but not increased

Normal side branches and end-organ perfusion

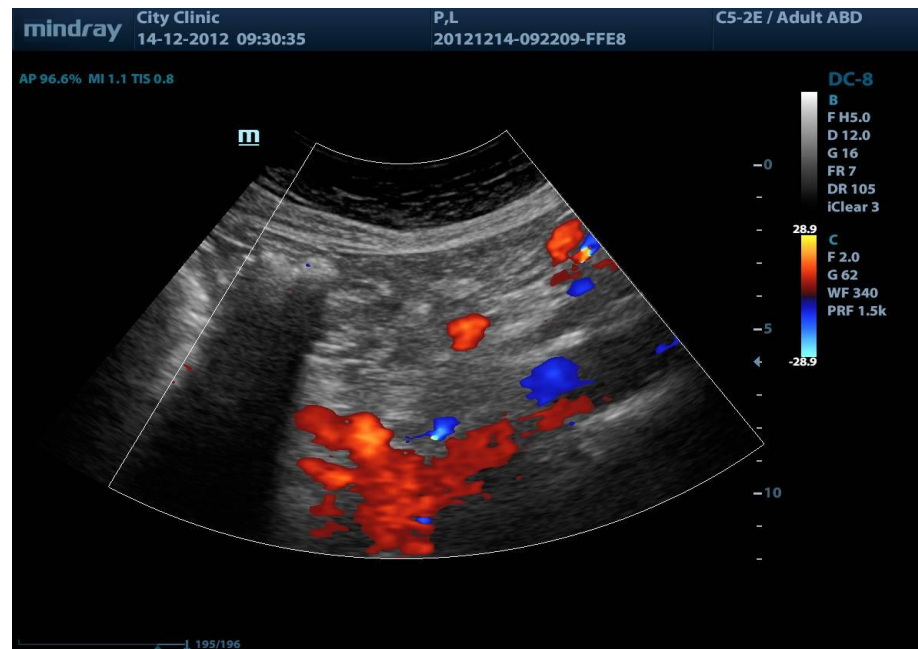


Color coded Doppler of the abdominal aorta. Normal flow into the abdominal aorta and visceral arteries.

Thrombosis of the false lumen.



# Celiac trunk



# ABI

- A.tib. Ant. Dex.- 145 mmHg    ABI (right leg)= 1.20
- A.tib post. Dex.-155 mmHg
- A.tib. Ant sin.-140 mmHg    ABI (left leg)=1.15
- A.tib post. Sin- 150 mmHg

# Discussion: Thoracic aorta endografting

## AIMS:



- Decompress and re-establish the flow in the true lumen
- Release the tension in the system false lumen\_true lumen
- Reestablish the end-organ perfusion
- Prevent false lumen expansion and/or induce false lumen thrombosis
- Stabilize dissected aortic wall and prevent rupture

# Conclusion

In aortic dissection the most important predictor of late survival is the favorable aortic remodeling (true lumen restoration and false lumen “passivation” or equalization)

The way of remodeling is not so important:

1. total false lumen closure or
2. equalization of size and flow in the false and true lumens- either are beneficial

Non covered stents modulating (restoring) the flow in the true lumen and allowing side branches and end organ perfusion is a safe and viable endovascular treatment in acute and late complicated AD cases



Thank you!

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