



# **Long Term Outcome for TEVAR in Acute Type B Dissection?**

**Han Cheol Lee, MD. PhD  
Pusan National University Hospital,  
Busan, South Korea**

# CASE 1

## Complicated Acute Type B Aortic Dissection

박O M/58

- 8 years ago
- Chief Complaint : back pain, left leg pain before 3 days
- Past History : HT(+), DM(+)  
Hyperlipidemia(-), CVA(-), Smoking (+)
- ABI : 0.2 / 0.9

# CT in 2010



| Idx    | Idx 170   | Idx 174   | Idx 19 | Idx 195    | Idx 20   | Idx 231    |     |
|--------|-----------|-----------|--------|------------|----------|------------|-----|
| Defini | Definitio | Definitio | Defini | Definition | Definiti | Definition | AS+ |
| Se 6   | Se 6      | Se 6      | Se 6   | Se 6       | Se 6     | Se 6       |     |
| Im 7   | Im 85     | Im 87     | Im 98  | Im 98      | Im 103   | Im 116     |     |
| CT     | CT        | CT        | CT     | CT         | CT       | CT         |     |
| FFS    | FFS       | FFS       | FFS    | FFS        | FFS      | FFS        |     |
| 2.0t   | 2.0thk    | 2.0thk    | 2.0thk | 2.0thk     | 2.0thk   | 2.0thk     |     |
| APPL   | APPLIED   | APPLIED   | APPLI  | APPLIED    | APPLIE   | APPLIED    |     |
| 0.0    | 0.0       | 0.0       | 0.0    | 0.0        | 0.0      | 0.0        |     |

|      |           |           |       |            |         |                     |                      |
|------|-----------|-----------|-------|------------|---------|---------------------|----------------------|
| FOV  | FOV 380   | FOV 380   | FOV 3 | FOV 380    | FOV 380 | FOV 380             |                      |
| TP   | TP 251.0  | TP 255.0  | TP 27 | TP 277.0   | TP 287  | TP 313.0            |                      |
| TI   | TI 500    | TI 500    | TI 50 | TI 500     | TI 500  | TI 500              |                      |
| kVp  | kVp 120   | kVp 120   | kVp 1 | kVp 120    | kVp 12  | kVp 120             |                      |
| mAs  | mAs 121   | mAs 131   | mAs 2 | mAs 213    | mAs 23  | mAs 231             | (370 mA)             |
| GT   | GT 0      | GT 0      | GT 0  | GT 0       | GT 0    | GT 0                |                      |
| Thor | Thorax    | Thorax    | Thora | Thorax     | Thorax  | Thorax              | 08_Aorta_all (Adult) |
| Aort | Aorta all | Aorta all | Aorta | Aorta all  | Aorta   | Aorta all           | 2.0 B31f             |
| 201  | (2010-05- | 2010-05-  | 2010- | (2010-05-2 | 2010-0  | 2010-05-26/10:03:58 |                      |

|             |      |  |  |  |  |  |  |
|-------------|------|--|--|--|--|--|--|
| W           | 400  |  |  |  |  |  |  |
| L           | 40   |  |  |  |  |  |  |
| Z           | 100% |  |  |  |  |  |  |
| Compression | 3:1  |  |  |  |  |  |  |

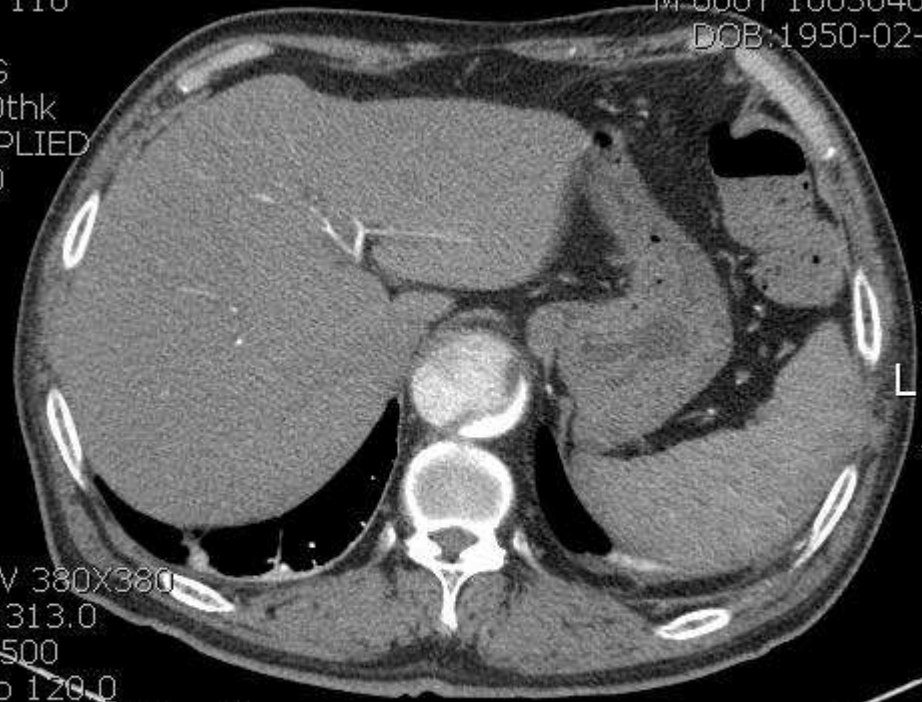
PNUH

2010-05-26

PARK SU SAENG ^

M 060Y 100304651

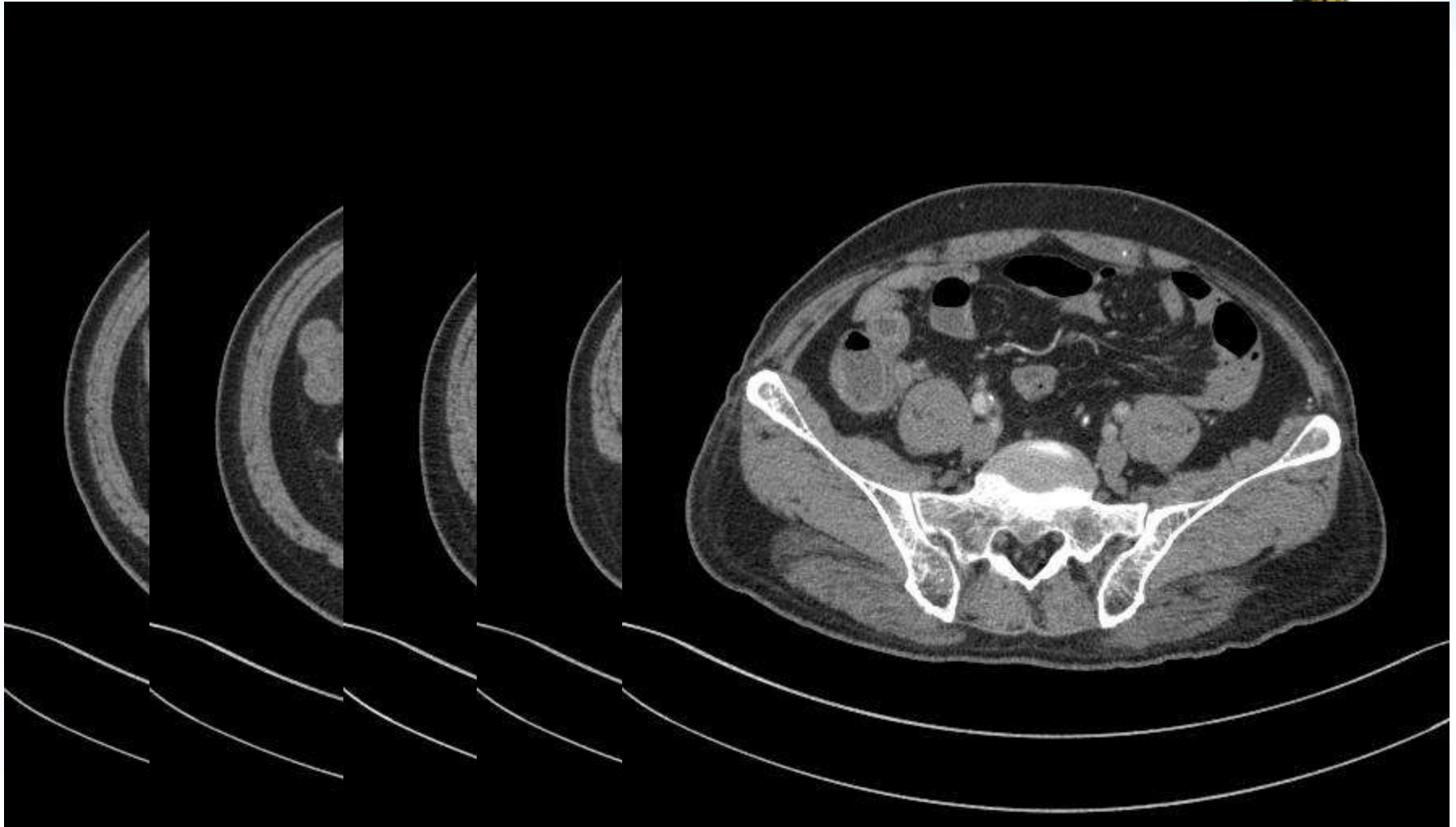
DOB: 1950-02-01



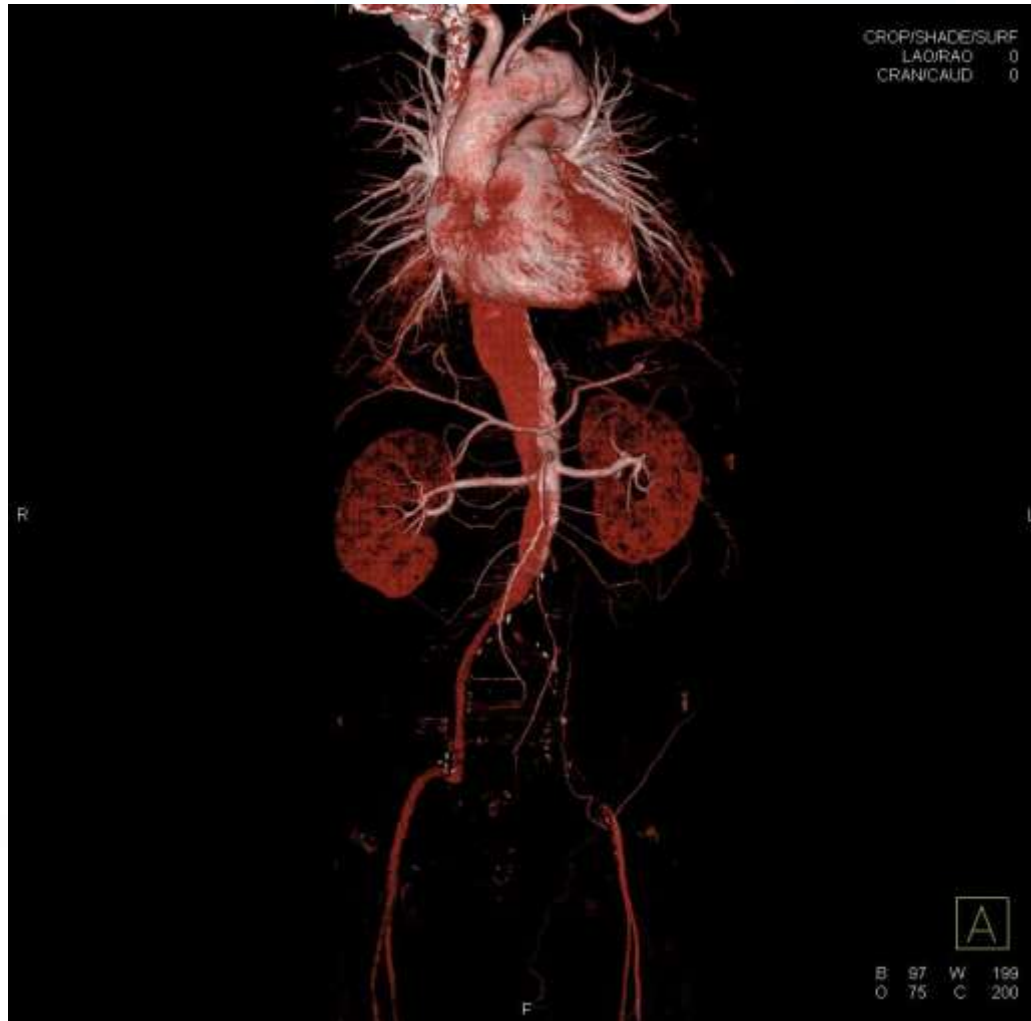
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50mm

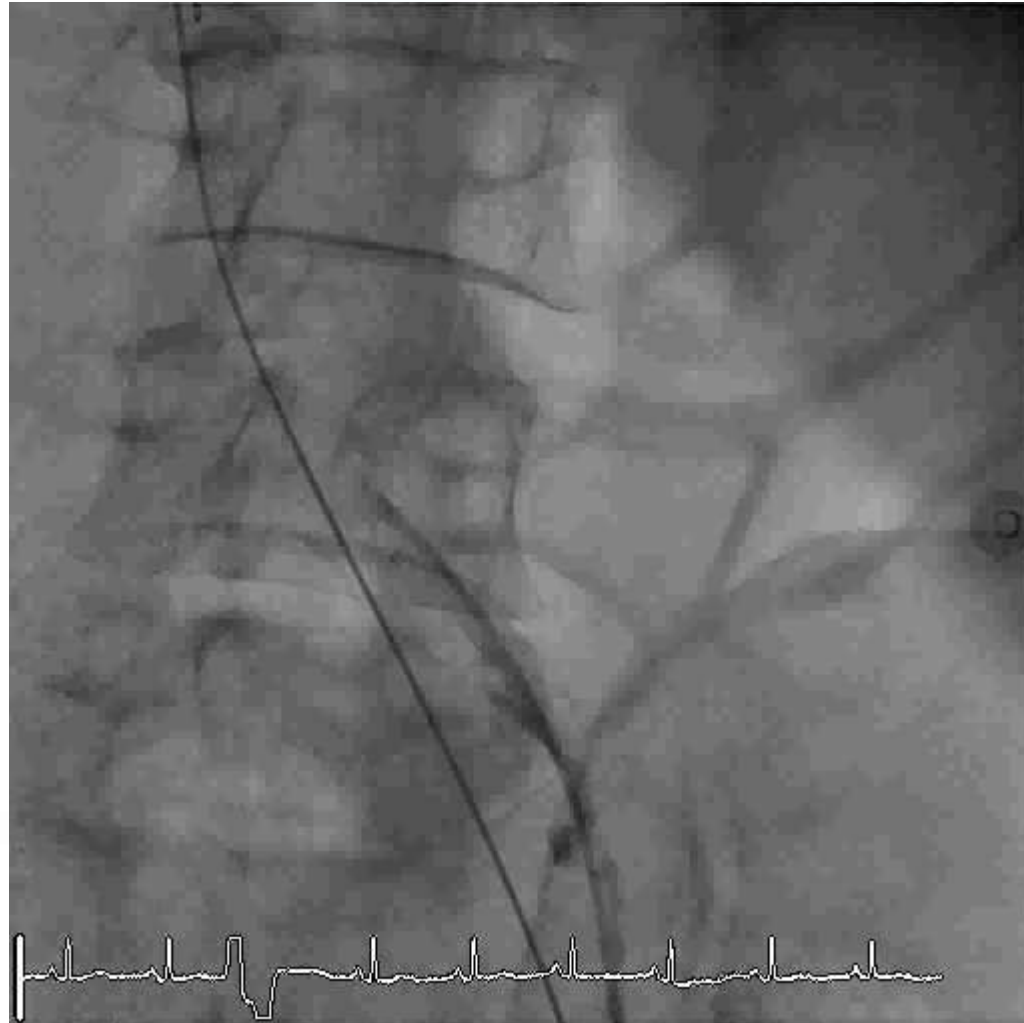
# CT in 2010



# CT in 2010

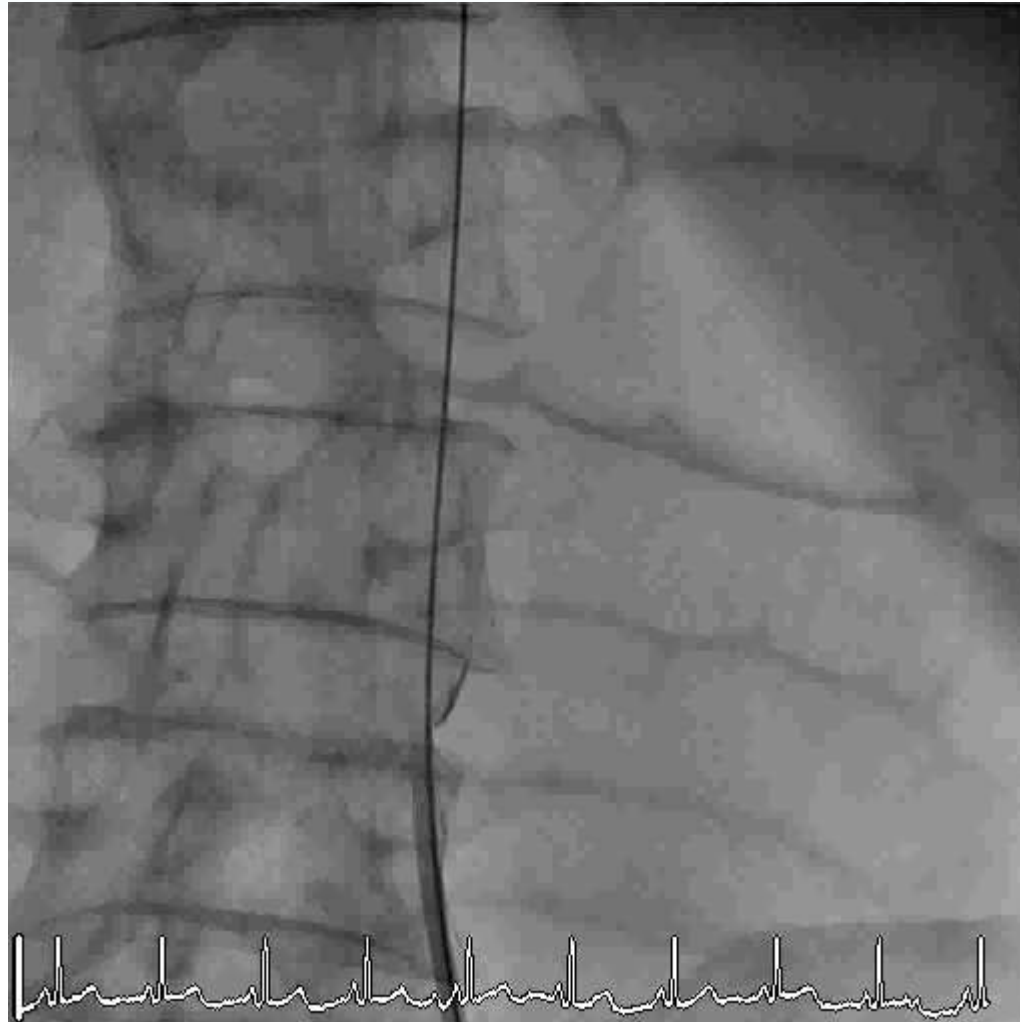


# Aortic Stent Graft in 2010

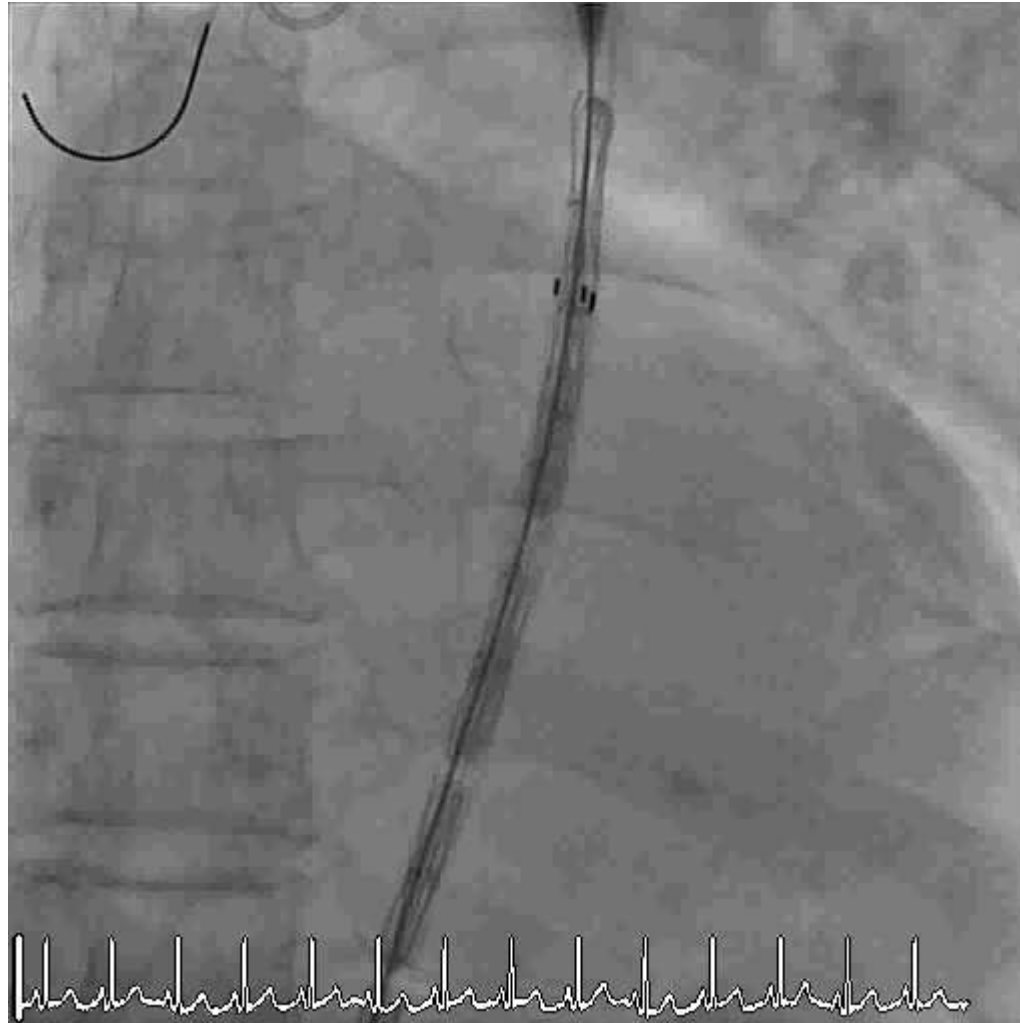




# Aortic Stent Graft



# Aortic Stent Graft





# Aortic Stent Graft





*Is he going to be happy during his long life ?*

# Prospective Study of TEVAR for Complicated Acute Type B AD



## STABLE 1 TRIAL : 1 year data

- 40 patients
- 30 day mortality < 5%
- Paraplegia < 2.5%
- Good aortic remodeling
- *Subacute phase treatment > 14 days : good result !*

# Long-Term Clinical Outcome of TEVAR for Complicated Acute Type B AD

| Author and Year (Ref. #)                  | n   | Pathology                                      | Early Mortality<br>n (%) | Mean Follow-Up<br>(months) | Survival Rate<br>(%)  |
|---|-----|--|--------------------------|----------------------------|---|
| <b>TEVAR vs. medical</b>                  |     |  |                          |                            |   |
| Chemelli-Steingruber TEVAR<br>2010 (15)   | 38  | Acute complicated                              | 5 (13.2)                 | 33 (0-97)                  | Dissection-death survival:<br>1-5 yrs (82.6)<br>Rupture free survival:<br>1-5 yrs (93.1)                      |
| Chemelli-Steingruber medical<br>2010 (15) | 50  | Acute  | 3 (6.0)                  | 36 (0-122)                 | Dissection death free:<br>1 yr (88.0)<br>5 yrs (74.9)<br>Rupture free survival:<br>1 yr (93.4)<br>5 yr (88.5) |
| Garbade TEVAR 2010 (17)                   | 46  | 27 acute complicated<br>19 acute uncomplicated | 9 (19.6)                 | 1,107 days                 | 1 yr (80)<br>3 yrs (73.3)<br>5 yrs (56.3)   |
| Garbade medical 2010 (17)                 | 84  | 63 acute uncomplicated<br>21 acute complicated | 7 (8.3)                  | 1,107 days                 | 1 yr (86.2)<br>3 yrs (80.9)<br>5 yrs (72.1)   |
| Fattori IRAD TEVAR 2008<br>(19,20)        | 43  | Acute complicated                              | 5 (11.6)                 | 2.3 yrs median             | on 27 patients<br>1 yr (88.9)<br>3 yrs (76.2)   |
| Fattori IRAD medical 2008<br>(19)         | 390 | Acute  | 34 (8.7)                 | 2.3 yrs median             | on 189 patients<br>1 yr (90.3)<br>3 yrs (77.6)  |

# Long-Term Clinical Outcome of TEVAR for Complicated Acute Type B AD



**5-year survival : 56.3%~ 87%**

**5-year freedom from aortic events : 45.0%~77.0%**

# CASE 2

## Uncomplicated Acute Type B Aortic Dissection

- **57 years old male**
- **CC: Chest pain & back pain**
- **CV risk: HTN (untreated)**
- **V/S at ER: 220/120 mmHg & 66 bpm**
- **CT at ER: uncomplicated aortic dissection  
stanford type B**

# CASE 2 : CT at ER





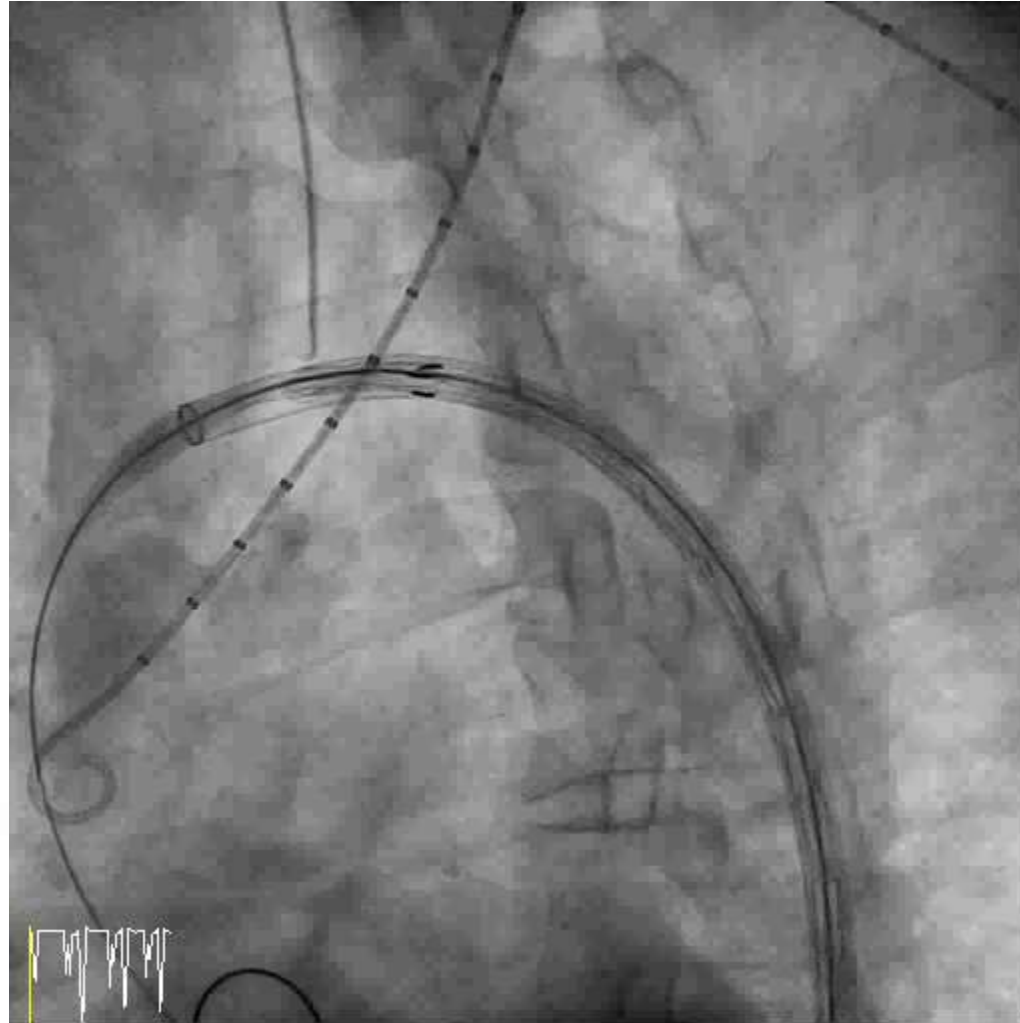
# How are you going to manage in the patient ?

## ➤ **Medical Treatment for Acute Uncomplicated AD**

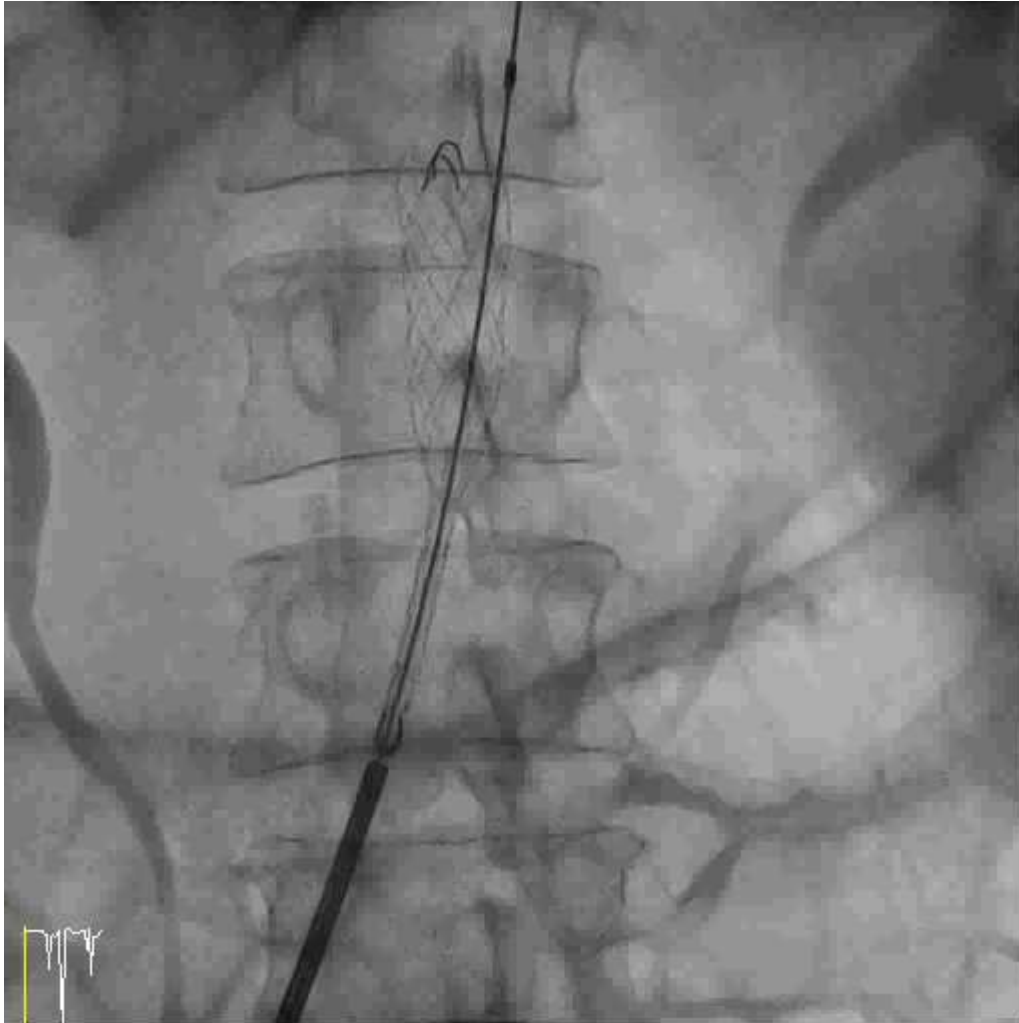
**TEVAR when Complicated AD is developed**

## ➤ **TEVAR for High Risk Acute Uncomplicated AD**

# Case 2: High Risk Uncomplicated Type B AD

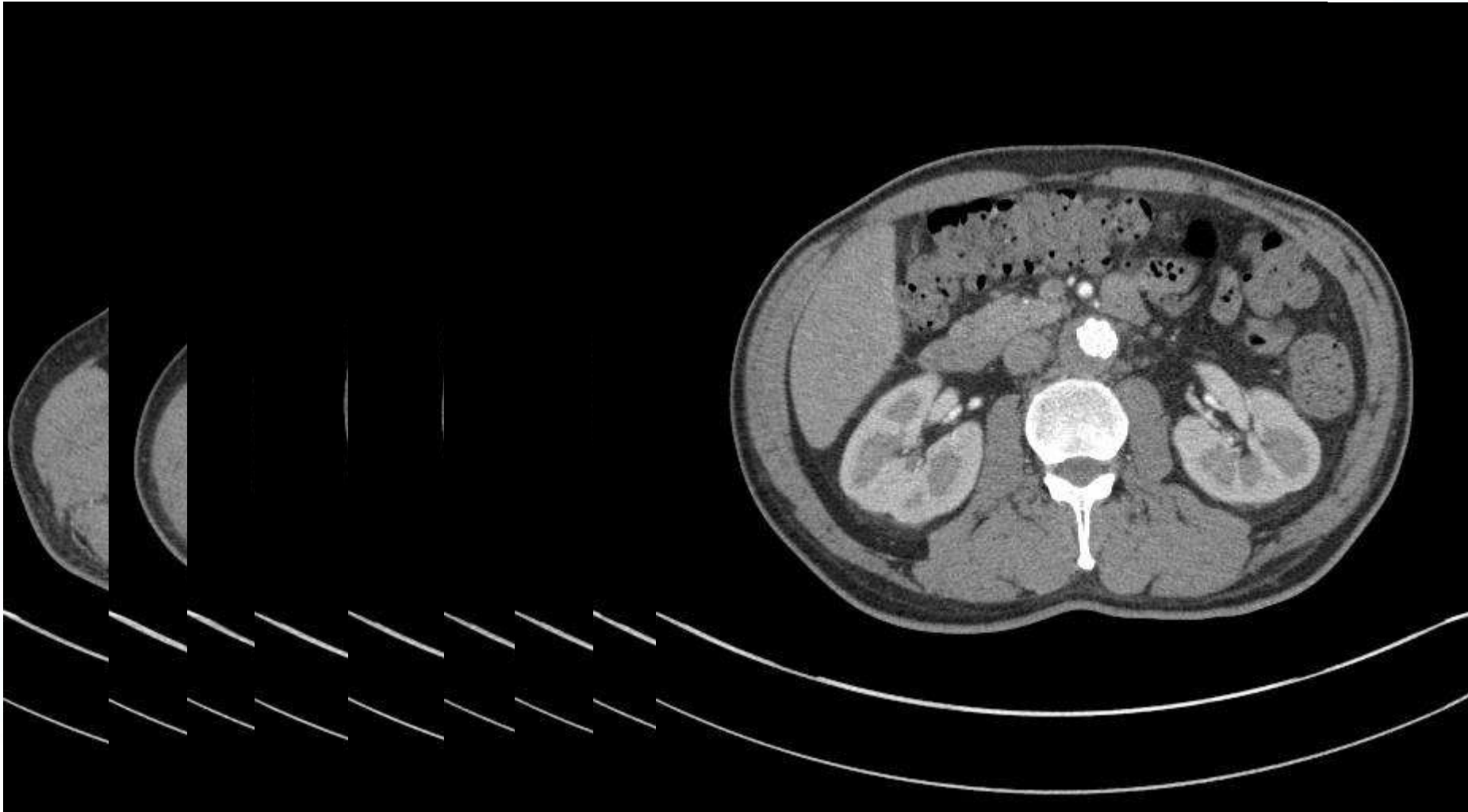


## Case 2: High Risk Uncomplicated Type B AD



Bare metal self-expandable stent in the infrarenal aorta

## Case 2 : CT after 7 Days



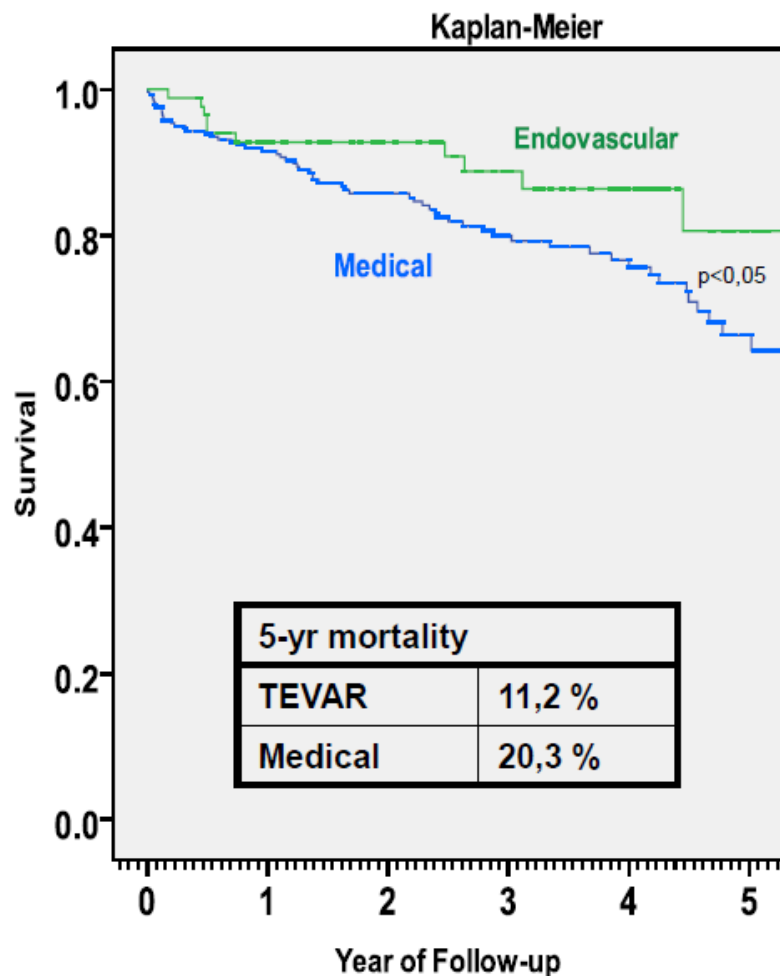
# Case 2 : CT after 7 Days





# **Long Term Clinical Outcome of TEVAR for Uncomplicated Type B AD**

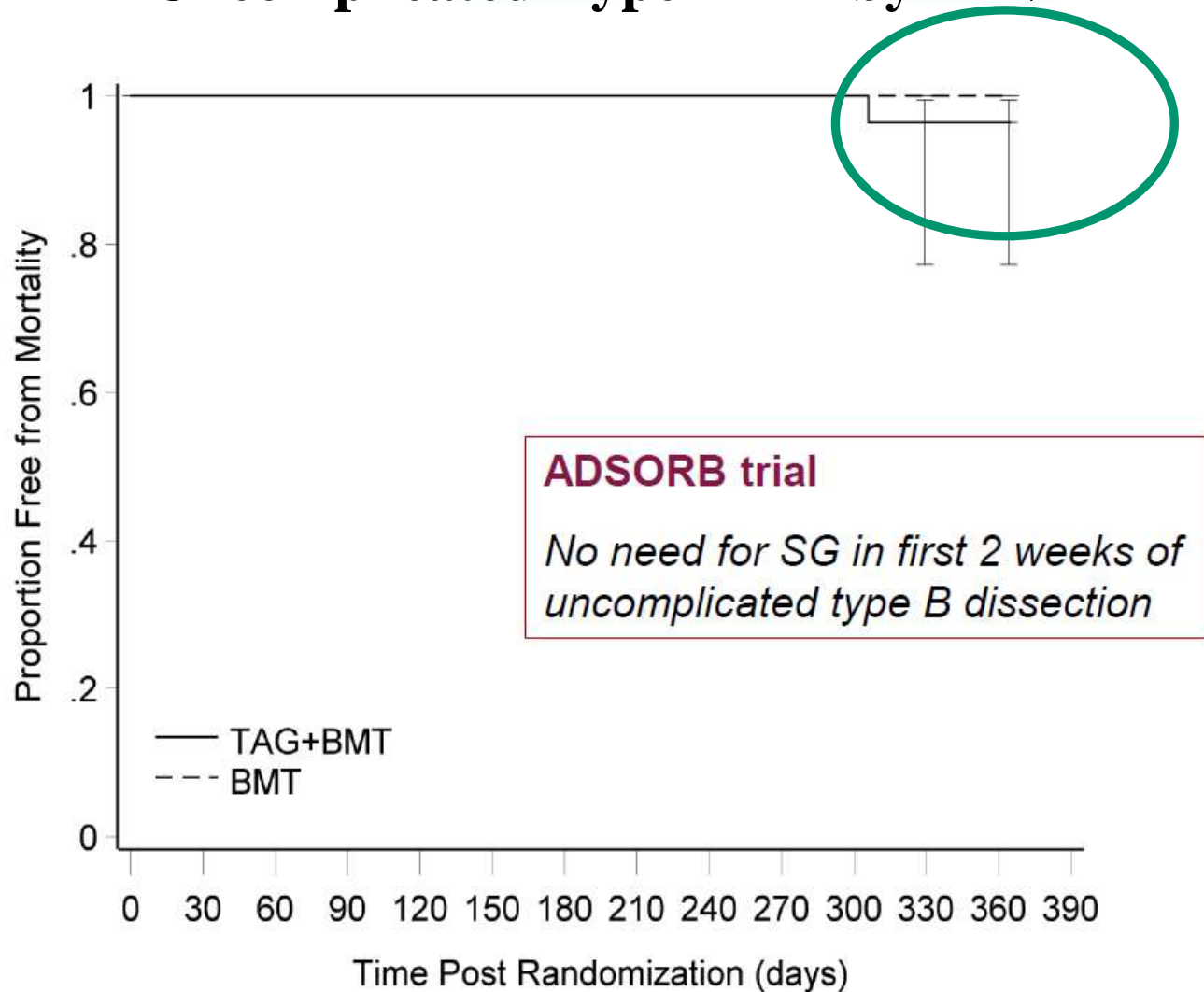
# TEVAR in Uncomplicated Type B AD ? : Long-Term Outcomes in IRAD





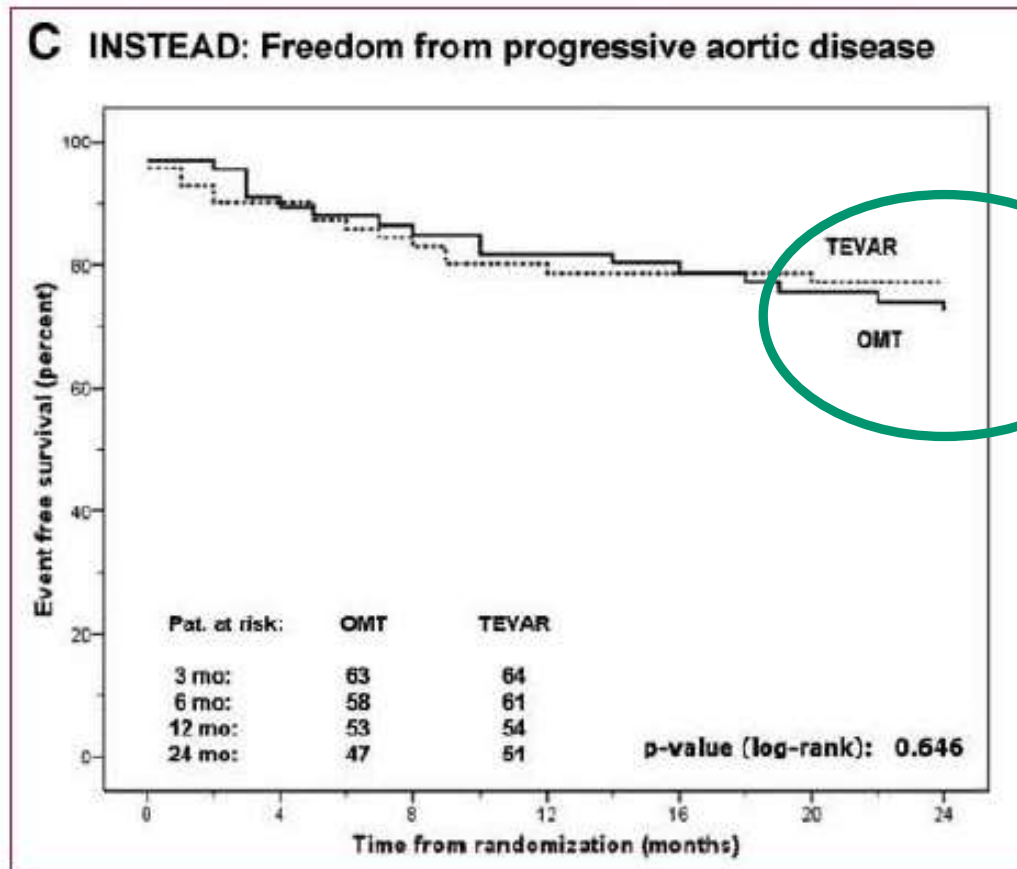
# ADSORB : 1 Year Mortality (GORE TAG)

## Uncomplicated Type B AD by TEVAR



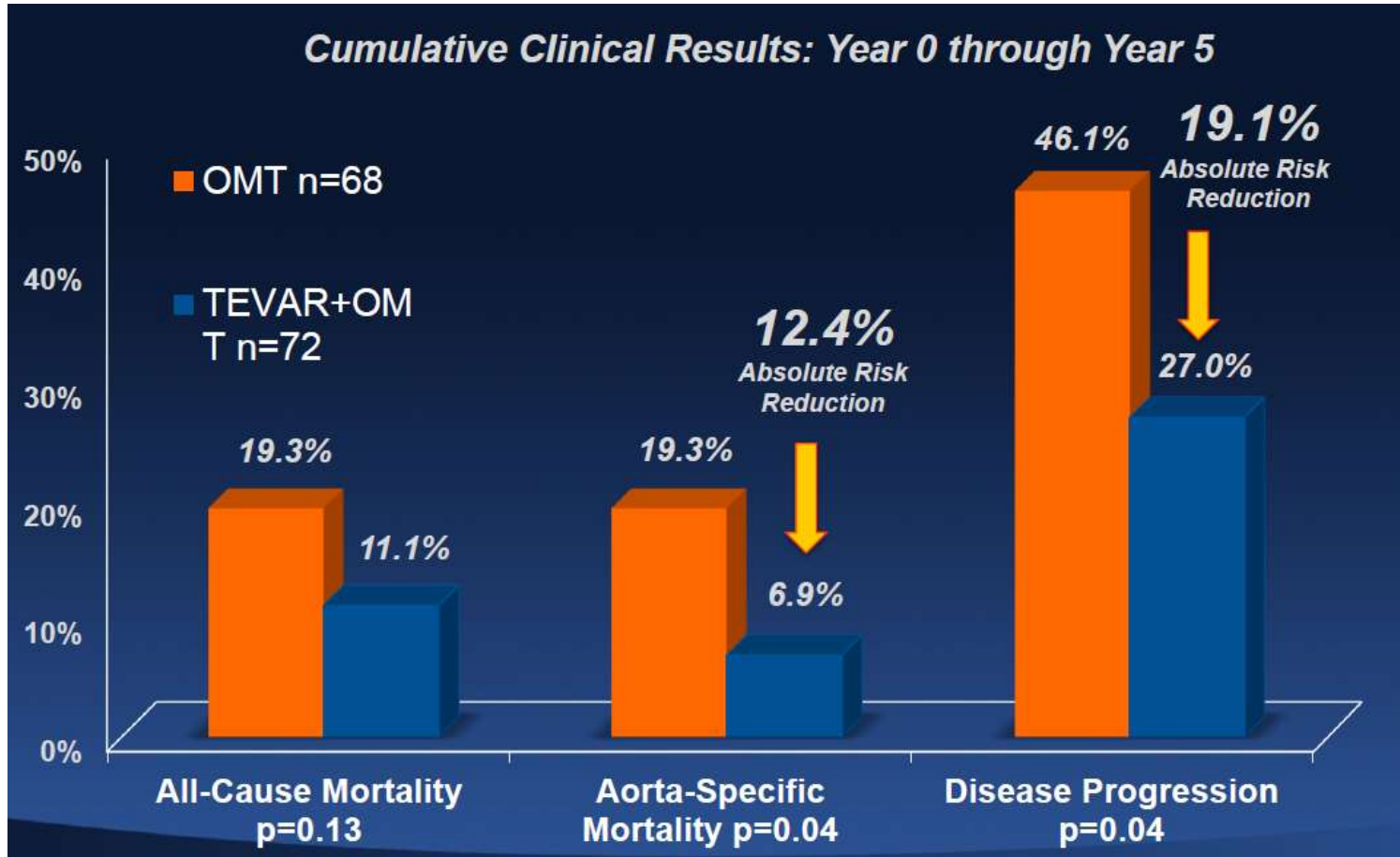
# INSTEAD Study

: 2 yr Outcomes of Uncomplicated Type B AD by TEVAR



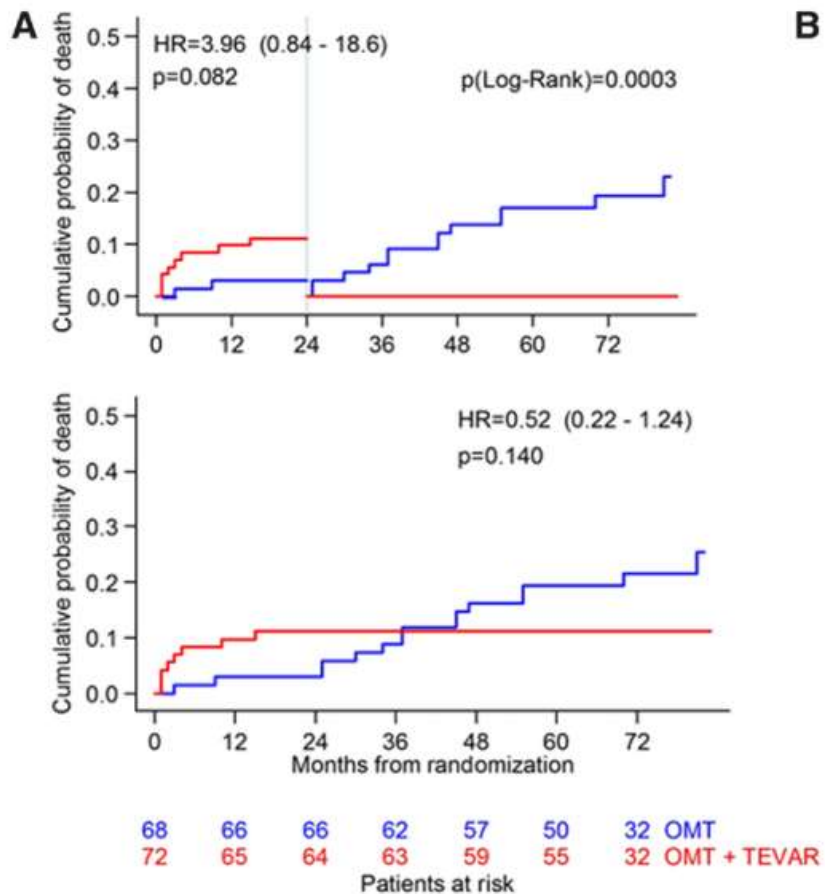
# INSTEAD-XR

## : 5 yrs Outcomes after TEVAR in Chronic Dissection

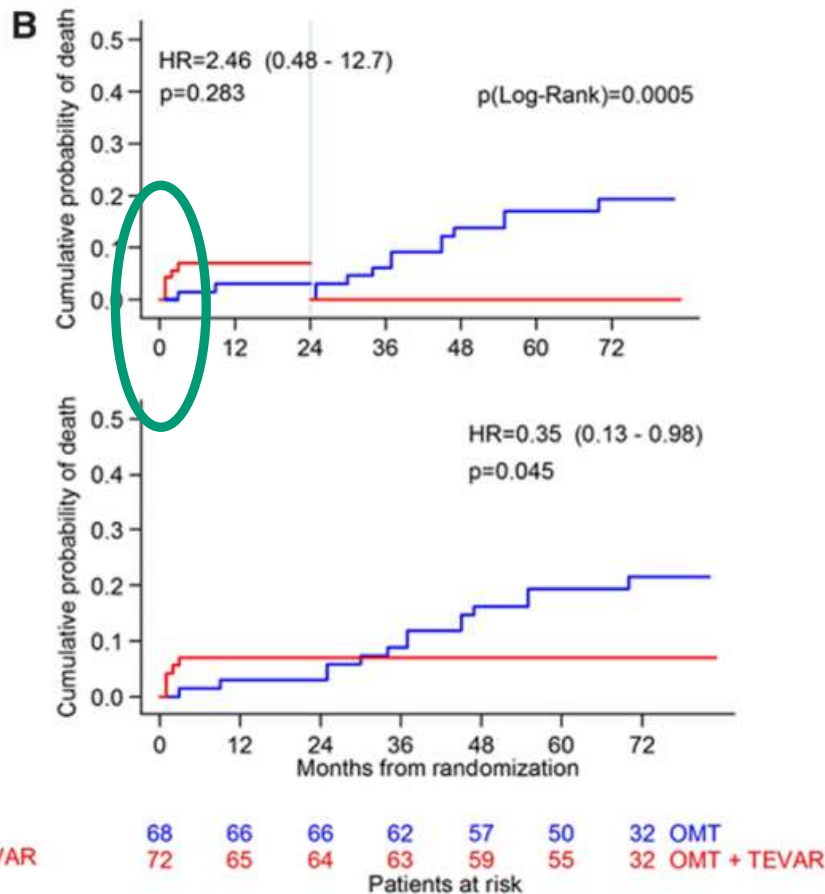


# INSTEAD-XR

## : 5 yrs Outcomes after TEVAR in Uncomplicated AD



**All-cause mortality**



**Aorta-specific mortality**

# INSTEAD-XR

## Causes of Death during 5 yrs

|          | OMT  | OMT+TEVAR  |
|----------|--|--|
| 0–12 mo  | #01 (AR-73) MPS<br>#02 (AR-244) R  | #01 (AR-6) type A<br>#02 (AR-15) R<br>#03 (AR-30) MPS<br>#04 (AR-53) R<br>#05 (AR-71) R<br>#06 (NR-112) AMI<br>#07 (NR-293) PN |
| 12–24 mo | #03 (AR-722) R   | #08 (NR-429) cancer  |
| 24–36 mo | #04 (AR-745) R<br>#05 (AR-900) type A<br>#06 (AR-1000) SD                                    |  |
| 36–48 mo | #07 (AR-1101) R<br>#08 (AR-1110) R<br>#09 (AR-1344) SD<br>#10 (AR-1349) R<br>#11 (AR-1401) R |  |
| 48–60 mo | #12 (AR-1629) SD<br>#13 (AR-1650) R  |  |
| 60–72 mo | #14 (AR-2075) SD<br>#15 (NR-2421) cancer   |  |

**No event !**

# Long-Term Clinical Outcome of TEVAR in Uncomplicated Type B AD



- **INSTEAD 2 Yr : Random Study → Fail**
- **ADSORB 1 Yr : Random Study → Fail**
  
- **INSTEAD-XL 5 Yr : Extended Study**
- **IRAD-LT 5 Yr : Extended Study, Registry Data**
  - **Favorable Results, Good aortic remodelling**

# Long-Term Clinical Outcome of TEVAR in Uncomplicated Type B AD



## INSTEAD-XR Conclusion

*Presumptive TEVAR can be performed*

*in high risk uncomplicated AD with favorable aortic anatomy*



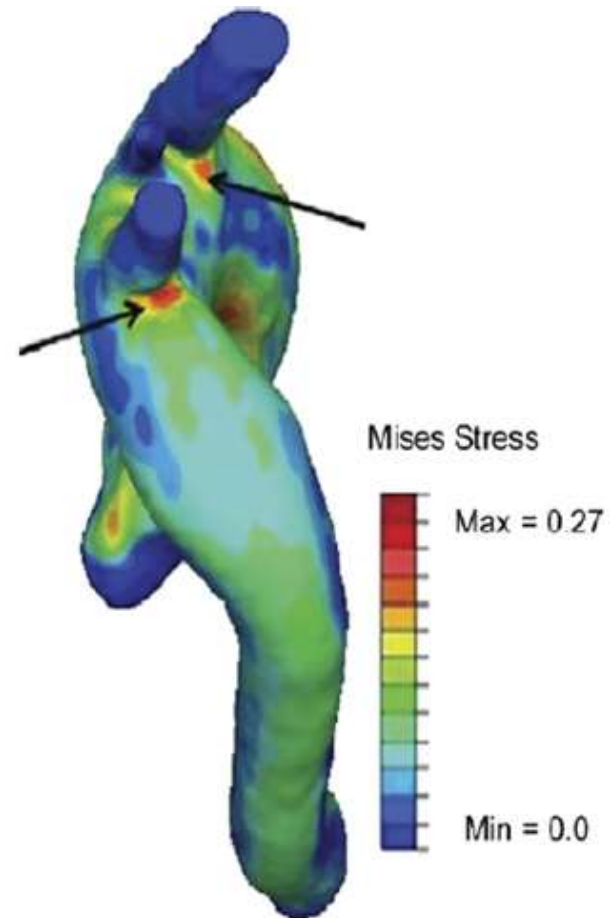
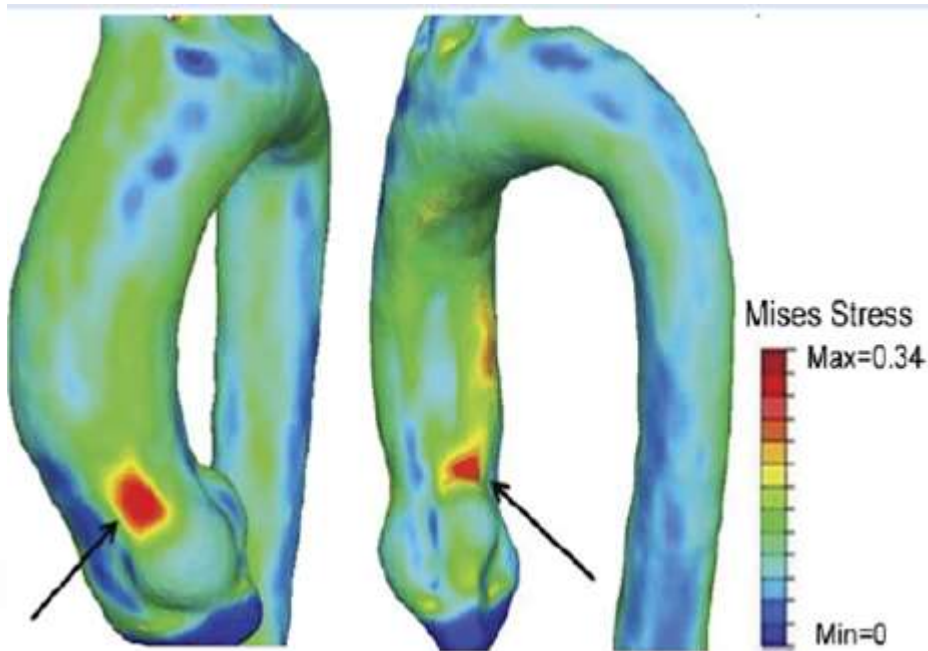
# High Risk Patient in Uncomplicated Type B AD

## *High risk predictors*

- Aortic diameter > 40 mm
- False Lumen > 22mm
- Rapid expansion > 5mm/y
- Patent false lumen
- Partial thrombosis of FL
- Saccular formation / ULP
- Large entry tear > 10mm
- Single entry tear
- Inflammation (FDG – uptake)
- Hypertension & Pain
- Age over 60 years
- Heart rate > 60bpm

# Disadvantages of TEVAR for Type B AD

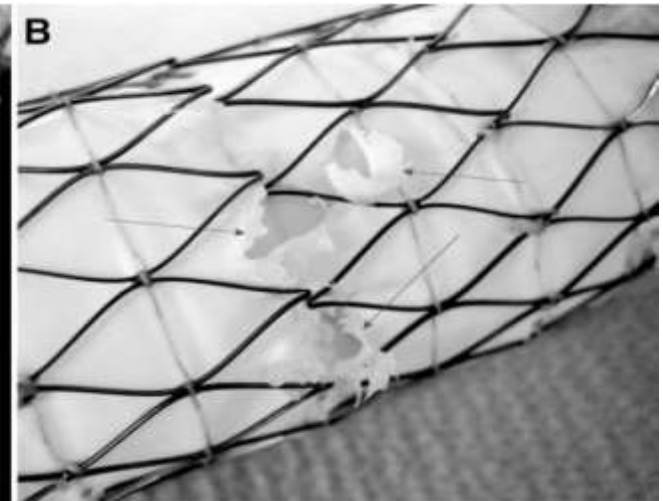
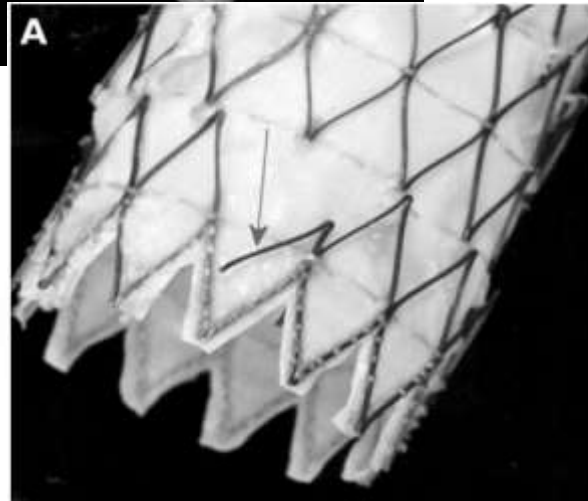
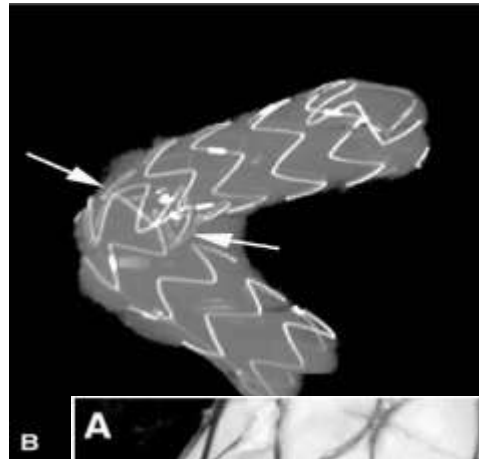
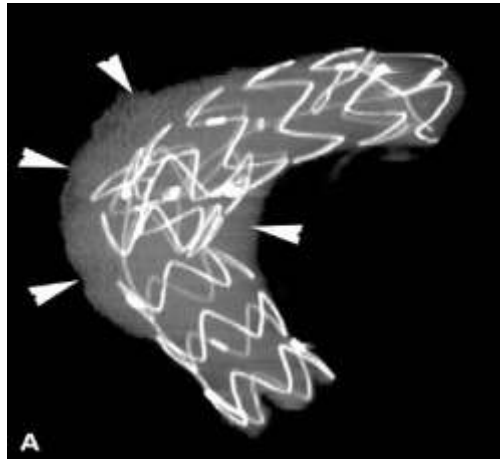
- Three dimensional anatomy is different from fluroscopic image : Aorta is not straight



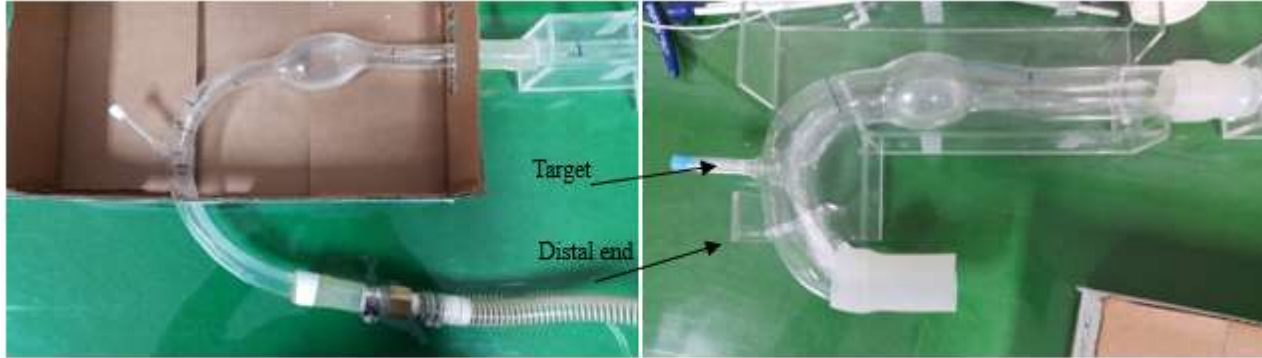
# Disadvantages of TEVAR for Type B AD

- Stent graft migration, Stent fracture, Fabric tear

during long term follow up

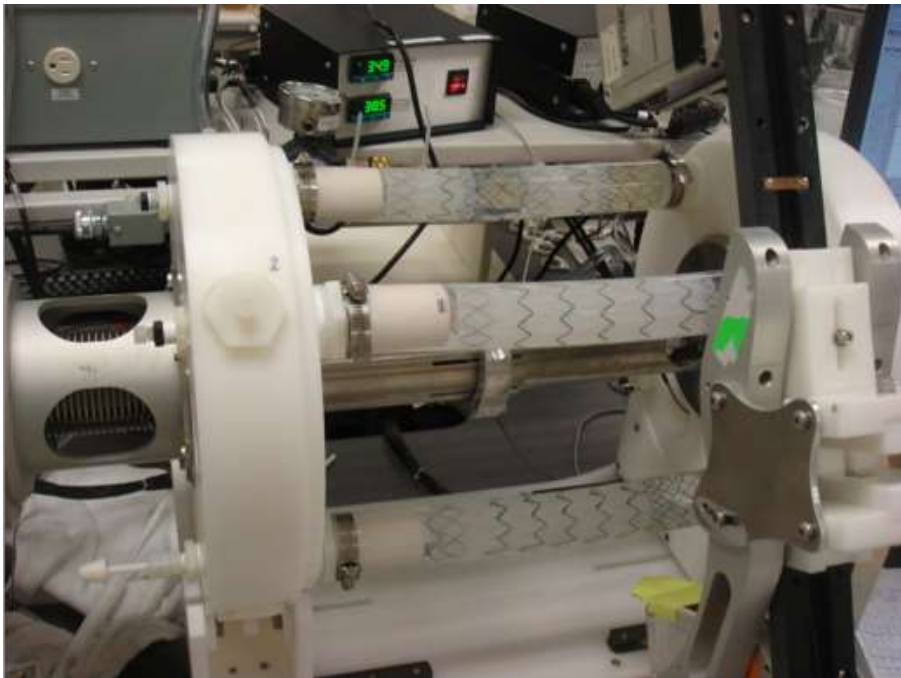


# Fatigue Test



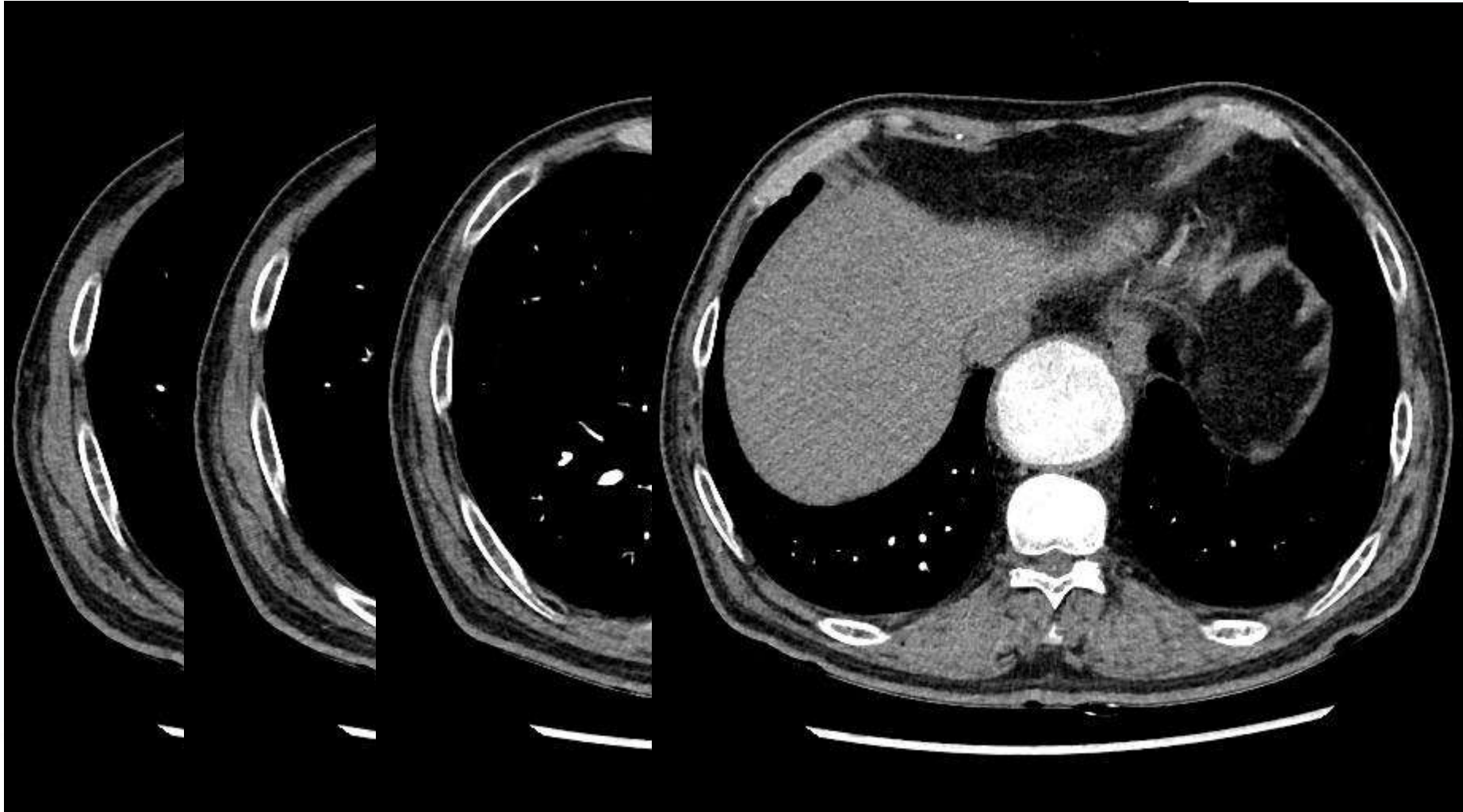
Phantom

*45,000,000 in the phantom  
= 10 years*

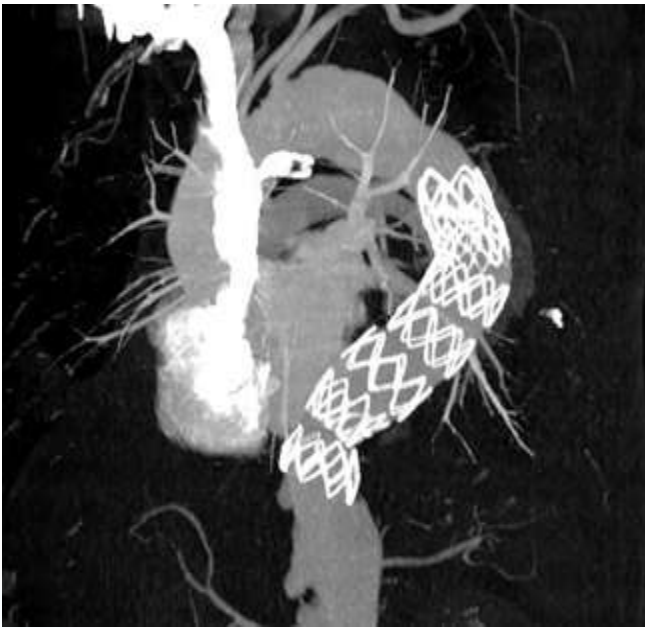




**Is he going to be happy during long life ?**  
**: Follow up CT after 8 years**



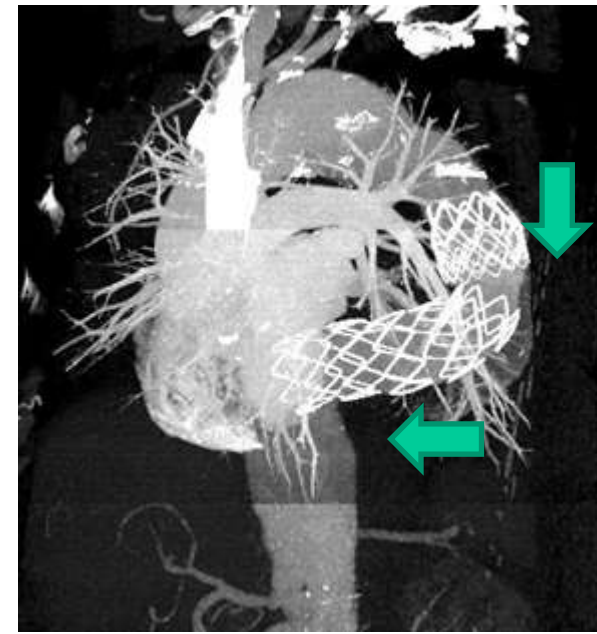
Is he going to be happy during long life ?  
: Follow up CT after 8 years



1 year



6 year



8 year

# SUMMARY

## Long Term Outcome TEVAR for Acute Type B AD

- No well designed randomized study ( up to 2 years)
- No long term registry data more than 10 years  
( 3-5 years datas)
- Aorta related CV events increase after 3-5 years
- Check and estimate CT every one or two year.



# Endovascular Treatment for complicated type B aortic dissection with malperfusion syndrome : Pusan National University Data



| Characteristic                   | Total n=21    |
|----------------------------------|---------------|
| Sex                              |               |
| Male                             | 17            |
| Female                           | 4             |
| Age                              | 54.24 (31-78) |
| Cormorbidities/risk factors      |               |
| Hypertension                     | 16            |
| Smoker                           | 15            |
| Previous coronary artery disease | 2             |
| Diagnosis                        |               |
| Aortic dissection type A         | 4             |
| Aortic dissection type B         | 17            |
| Presentation                     |               |
| Visceral ischemia                | 5             |
| Limb ischemia                    | 11            |
| Renal ischemia                   | 10            |
| Neurologic deficit               | 3             |

## Malperfusion syndrome involved in

celiac artery 4  
 superior mesenteric artery 1  
 renal artery 10  
 iliac artery 11  
 common carotid artery 2  
 left subclavian artery 1  
 Distal aorta 2

## Management

aortic stent graft 10(47%)  
selective stenting 31 arteries  
 fenestration 1

**Technical success : 100%(21/21).**

**Mortality rate : 4.7%(1/21)**

**Follow up duration: 32.5 months**

# Endovascular Treatment in Ruptured Type B AD : Pusan National University Data



|                                | AD(n=11 )       |
|--------------------------------|-----------------|
| Hospital length of stay (days) | 22±20.42        |
| Technical success              | 9(81.8%)        |
| During follow up outcome       |                 |
| Total MAE                      | <b>4(36.4%)</b> |
| Death(all aorta death)         | <b>1(9.1%)</b>  |
| Secondary intervention         | 0(0.0%)         |
| Major stroke/paraplegia        | <b>1(9.1%)</b>  |
| Secondary endoleak             | 2(18.2%)        |

median follow up :

308 days (61-1036.5).



**Thank you for your attention**